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The entertainment features of the annual meeting of the Railway Signal Association in Louisville last week were in discouraging contrast to the stand taken by the Master Car Builders' and American Railway Master Mechanics' associations in June; an attitude which is likely to be still further strengthened at next year's mechanical conventions. The official and private entertainments left little for the members of the Railway Signal Association and their families to provide, aside from railway transportation and room rent—and some left Louisville with no concern about the latter. It is to be hoped that future conventions of this important and growing association will be free from this blemish. There can be no objection to general entertainments, the cost of which is shared by all supply houses alike, for the recognized commercial object of getting acquainted with their customers, unless these entertainments are extended to a foolish degree. But a competition between sellers to see which of them can induce a buyer to accept the most personal favors cannot possibly accomplish anything useful, while the young delegate who starts his convention experience by allowing a supply man to pay his hotel bill is not likely to grow up into a valuable railway officer.

Following the publication by C. C. McCain, chairman of the Trunk Line Association, of a pamphlet entitled "The Diminished Purchasing Power of Railway Earnings," a large group of shippers' associations in Cincinnati, Toledo, Dayton, Indianapolis and Columbus have made spirited rejoinder, to the effect that while it is undoubtedly true that wages and the prices of commodities have increased materially in the last ten years, it is also true that the railways have much bigger net incomes and are in every way more prosperous than they were ten years ago. The shippers have hit Mr. McCain squarely in his weak spot, because, as we pointed out in reviewing his pamphlet, he presented only one side of his case. Mr. McCain should have been the first to call attention to the increased prosperity of the railways in 1907, as compared with 1897, a fact which in no way weakens his real position. It is evident that, given a transportation system of a certain capacity, it will be more profitable to do a great deal of business on it at relatively low rates than a small amount of business at relatively high ones. But, with wages and the costs of materials constantly tending upward, and freight rates constantly tending downward, it will be only a question of time, and very brief time, before business will be done at a loss; and the more business done, the bigger the loss. The principal difference between Mr. McCain and the shippers is that he wishes to make adjustments before the period of unprofitable operating arises, while the shippers want to see the roads operated at a loss before any change is made. The final result of all this rate agitation, like the final result of most other agitations, will doubtless be a compromise, in which the railways will carry freight a little more cheaply than they want to and the shippers will pay a little higher rates than they want to. But Mr. McCain is absolutely unassailable in his position that increases in railway rates must ultimately follow increases in the costs of everything else; otherwise the expense curve, bending upward, will inevitably have to cross the downward bending curve of income per unit of service rendered.

The Pennsylvania Railroad continues its vigorous campaign against trespassers on its tracks and trains, but the task is a formidable one. An officer of the road who has lately been reviewing the subject says that the practice of walking on railway tracks has been growing constantly; and yet the Pennsylvania alone had over 11,000 trespassers arrested in the year 1908. This statement is given in a circular which has been issued by the company, prefaced by some figures showing the aggregate number of trespassers killed and injured on the railways of the country during the 10 years ending December 31 last. The total number killed was forty-seven thousand four hundred and sixteen; a truly startling figure, although everyone who cares has had the information before him, year by year, in the reports of the Interstate Commerce Commission. The number has been constantly increasing with the increase in population and with the building of new railways. In 1898 the number killed was 4,063; in 1903 it was 5,000, and in 1907 it rose to 5,612, more than 15 a day. On the Pennsylvania alone, in 1907, the number of trespassers killed was 915. These are not all tramps, by any means; the list includes factory workmen and other laborers, and also the wives and children of men living near the tracks. Formerly the trouble was the comparative indifference of the railways and of the magistrates; now, with the railways active, the difficulty with the magistrates still remains. They are reluctant to put upon the county the cost of supporting the vagrants in the jails. The Pennsylvania says, in its circular, that many of the im-

portant railways have determined to redouble their efforts to secure the rigid enforcement of the law, but it gives no names but its own. At Bellwood, Pa., near Altoona, the Blair County Pomona Grange, on May 26 last, passed resolutions protesting against the "injustice" worked upon the farmers by the action of the railway in forcing the tramps to leave the tracks. The farmers are now constantly pestered with them, and their wives and children are kept in fear. The circular is accompanied by newspaper comments on this state of things as well as on other phases of the subject. The *Elmira* (N. Y.) *Telegram* is quoted as calling on the magistrates and the railway officials to speedily come to an agreement. The cost of subduing the train-riders and the tramps should be made a state charge, instead of putting the burden on the local communities. Magistrates would then inflict severer punishment. The culprits ought to be sentenced to two or three months in the penitentiary.

We do not think that cost of service should be made the sole or the main criterion of the reasonableness of railway rates. But if, as many of those who attack existing rate adjustments contend, cost of service is the only fair test of the reasonableness of the rates charged for hauling the same commodity different distances, why is it not the only fair test of the reasonableness of the rates charged for hauling different commodities the same distance? If the lowest rate per ton per mile that a railway accepts for hauling a given commodity between any two points should be taken as the measure of the fairness of its rates for hauling that commodity between all other points, why should not the rate per ton per mile that it accepts for hauling coal be taken as the measure of the reasonableness of its rates for hauling dry goods, due allowance being made, of course, for the greater risk of hauling dry goods, for the smaller tonnage that can be got in a car and for the other factors that actually make greater the cost of hauling a ton of it? On the cost-of-service theory most of the existing wide differences between the rates charged for high class commodities and those charged for low grade commodities are absolutely indefensible. They are defensible only on the grounds that it is *a more valuable service to the shipper* to have high class articles hauled than to have low grade commodities hauled, and that if the same rates were applied to all commodities the lower grades could not move. But there is no sense or logic in saying that rates on different commodities may fairly be adjusted according to the value of the service rendered to the shipper, while rates on the same commodity for different distances can fairly be based only on the cost of the service to the railway. If it is necessarily wrong for the railway to make a larger profit from hauling first class goods for A than it makes for hauling them for B, then it must be wrong for it to make a larger profit from hauling first class goods for A than it makes from hauling coal, or stone or grain for C. If this reasoning be erroneous, we should like to have Spokane's rate expert, Frank H. McCune, or Salt Lake's rate expert, H. C. Babcock, or Oklahoma City's rate expert, J. H. Johnston, or any other gentleman who advocates basing rates on cost of service, tell us wherein it is erroneous. If it be correct, all the jobbers who are asking that their rates shall be reduced to the lowest basis on which rates are made to jobbers at any point, could with perfect consistency demand that all the rates they pay on class articles should be reduced so that they will contribute no more to the railway's maintenance and operating expenses, fixed charges and dividends than is contributed by the article which is given the lowest commodity rating that can be found by a diligent search of the tariffs on file with the Interstate Commerce Commission. Of course, the logical application of the cost-of-service principle would bankrupt all the railways if all rates were reduced to the basis of the lowest, and would paralyze the commerce of the country if the lower rates were raised to the level of the average. But to us this does not seem to show that the principle is right, but merely impracticable of application on a large scale. It seems to us to tend to show that it is intrinsically wrong and vicious.

THE SCHEME FOR SYSTEMATIC SIGNALING.

The slow process of educating the members of the Railway Signal Association up to an appreciation of the importance of adopting a standard scheme of signaling—that is, of indications and aspects—has been brought by the Louisville meeting a step farther forward. The process is necessarily slow, because it must include not only all of the signal engineers but operating officers as well; and few of these attend the meetings. Granted that a standard scheme is desirable and necessary, the problem still remains difficult, because everybody can get along so well without uniformity. Only those who appreciate the value of work which looks 10 or 20 years into the future will take a lively interest in improvements in our American signaling, the theories of which are pretty good as they are. In short, the new scheme is not likely to be justified except by throwing into the scale in its favor *all* of the elements of its superiority: simplicity, comprehensiveness, economy and increased safety. And the first two of these must go together. Opponents will say that the committee's scheme is not simple; but it will be admitted, doubtless, that it is as simple as it can be made while still retaining its comprehensiveness (except, perhaps, that one of the three aspects of the dwarf arm might be omitted).

The first question, therefore, is, Do the railways of the country want a comprehensive system? The most forcible answer to this question is that, whatever may be *said* on the negative of this question, the *acts* of numerous railways show that they are determined to seek improved methods whenever they feel a need in that direction; and if we do not proceed logically and systematically, we shall make progress of some other kind. In the presentation this year of modified schemes, under which a road of thin traffic may keep in line with those doing the heaviest business, the committee seems to have well answered those who object to the expense of lights (and arms) not required for every-day movements. The real strength of the opposition seems to lie in the widespread feeling among superintendents, trainmasters and enginemen that all of the benefits of the new scheme can be had without adopting all of its details, and in the fear that the instruction of enginemen in the new language of signals would be a difficult task.

As to the first point, the committee seems to be on pretty firm ground, for not only does its membership include a good number of representatives of our most enterprising roads, dispelling any doubts as to the thoroughness of its study of the problem; but also it can be said that important features of the scheme have been put in use by the Pennsylvania, the New York Central and the Baltimore & Ohio. The question of the instruction of enginemen is the crux of the matter. Certainly, there is no use in providing signal indications for three different speeds if the enginemen do not heed the differences. Whether they run fast by force of a bad habit, and not because the signal gives them the right to do so, or they keep their speed low because they are too dull or careless to learn the scheme of signaling, in either case they nullify the value of the signals. There is no denying the strength, among the officers of many roads, of the old feeling that enginemen must be trusted largely to their own intuitions; that the fewer fixed signals they have the better will they get along. The committee must overcome this feeling if it is to make sure progress, for a force of enginemen who will intelligently take advantage of all of the benefits of the new scheme must be regarded as one of its foundation stones. Experience with the enginemen who run into the Broad street terminal at Philadelphia cannot be safely depended on as a

criterion of what may be expected out on the Great American Desert.

The economy of the new scheme depends partly on its general adoption, of course; but its fitness to facilitate train movements constitutes its main claim in this respect. With enginemen properly trained there can be no doubt that this scheme provides for the fullest use of either a main line or a yard. As to safety, the strength of the scheme lies in its provision of indications so precisely defining what an engineman may do, in any and all situations, that he need never be in doubt. When a scheme of signaling has removed all causes for enginemen's doubts it has fulfilled its function. It is then up to the superintendent to see that the runners do not indulge in causeless doubts.

The railway world is to be congratulated on the action of the committee in persistently including aspects 4A and 4B; and in adding Exhibits 5 and 6, showing proposed designs for flag station signals, aspects for entering sidings, etc. Whether all these signals and aspects are desirable may be a debatable question, but as long as they are actually used the question of uniformity is not debatable; they should be made as nearly uniform as is consistent with simplicity. As regards these features, as well as the substance of the report as a whole, it is to be hoped that the committee will succeed in keeping the railway men of the country interested in its work continuously. Why wait till next October for further progress?

THE HAWLEY SYSTEM.

The accompanying map shows the very important change which has been made in the Hawley system of railways by adding to it the Missouri, Kansas & Texas. Announcement of this was made last week in a statement by Mr. Hawley, that he and Mr. Yoakum had bought a large interest in this railway, which, in connection with the holding of Speyer & Co., gave these associates a predominating strength in the property. Mr. Hawley was further quoted as saying that the stock was acquired both in the open market and through outside negotiations, a large part having been purchased from Dutch and English holders. Subsequently, Adrian H. Joline issued a statement announcing his resignation as president of the Missouri, Kansas & Texas, and adding that it had been for a long time manifest that the system must eventually be allied with some strong railway interest, in order that the property might be developed and its business increased; that he himself had occupied the position of president for the last three years in expectation that some alliance beneficial to the property would be made, and that Messrs. Hawley and Yoakum, and the Speyer brothers, who had been financial members of the board for some years, had acquired so large an interest that it was desirable that they should assume charge of the active management. This addition brings the total length of the Hawley system up to 9,081 miles* if the portions of the Kansas City, Mexico & Orient now in operation be included. The Kansas City, Mexico & Orient is not owned by the Hawley interests, but the traffic arrangements agreed upon last June with the Chicago & Alton are such that it is, to all intents, a portion of the system.

The gathering of this group of roads, with their curious dissimilarities, into one control, has been a process unlike that which has attended the growth of any other American railway system. Until recently, it was absurd to speak of the Hawley lines as a system at all; they were merely a disconnected group of roads, with two small granger lines and a local line in the Central West, and the Colorado & Southern in the Southwest, separated from the others by many miles of territory, and possessing no common interest with them. Moreover, the control of these roads has been characteristically held through a strong minority instead of through actual majority purchase. But when the Clover Leaf obtained control of the Chicago & Alton, in August, 1907, the Hawley group of roads in the Central West began to assume the form of a system, and this appearance was greatly heightened by the sale of the remote Colorado & Southern to the Burlington, in January, 1909, and the addition to the Hawley group of the Chesapeake & Ohio. In June, 1909, it was announced that the Chesapeake & Ohio had obtained control of the Chicago, Cincinnati & Louisville, which, with its direct line from Cincinnati to Chicago, ties the Chesapeake & Ohio to the Toledo, St. Louis & Western and the Chicago & Alton, and thus connects all the hitherto separated properties operated by the Hawley interests. Strategically, the C., C. & L. is the indispensable link between portions of this system of roads, otherwise widely separated. Yet, even so, it fails to connect in a direct and effective manner the eastern portions of the Hawley group with those in the West and Southwest. It is neither reasonable nor expeditious to haul freight from Cincinnati and points east to St. Louis and points south by way of Marion, Ind.

The traffic analogy between the Chesapeake & Ohio and the Alton-Clover Leaf-Iowa Central-Minneapolis & St. Louis appears more real. The Chesapeake & Ohio ought to be able to add a very important coal traffic to its new western partners and to receive an important grain traffic in return, although the territory is exceedingly competitive, and the Chesapeake & Ohio had advantages as an independent line.

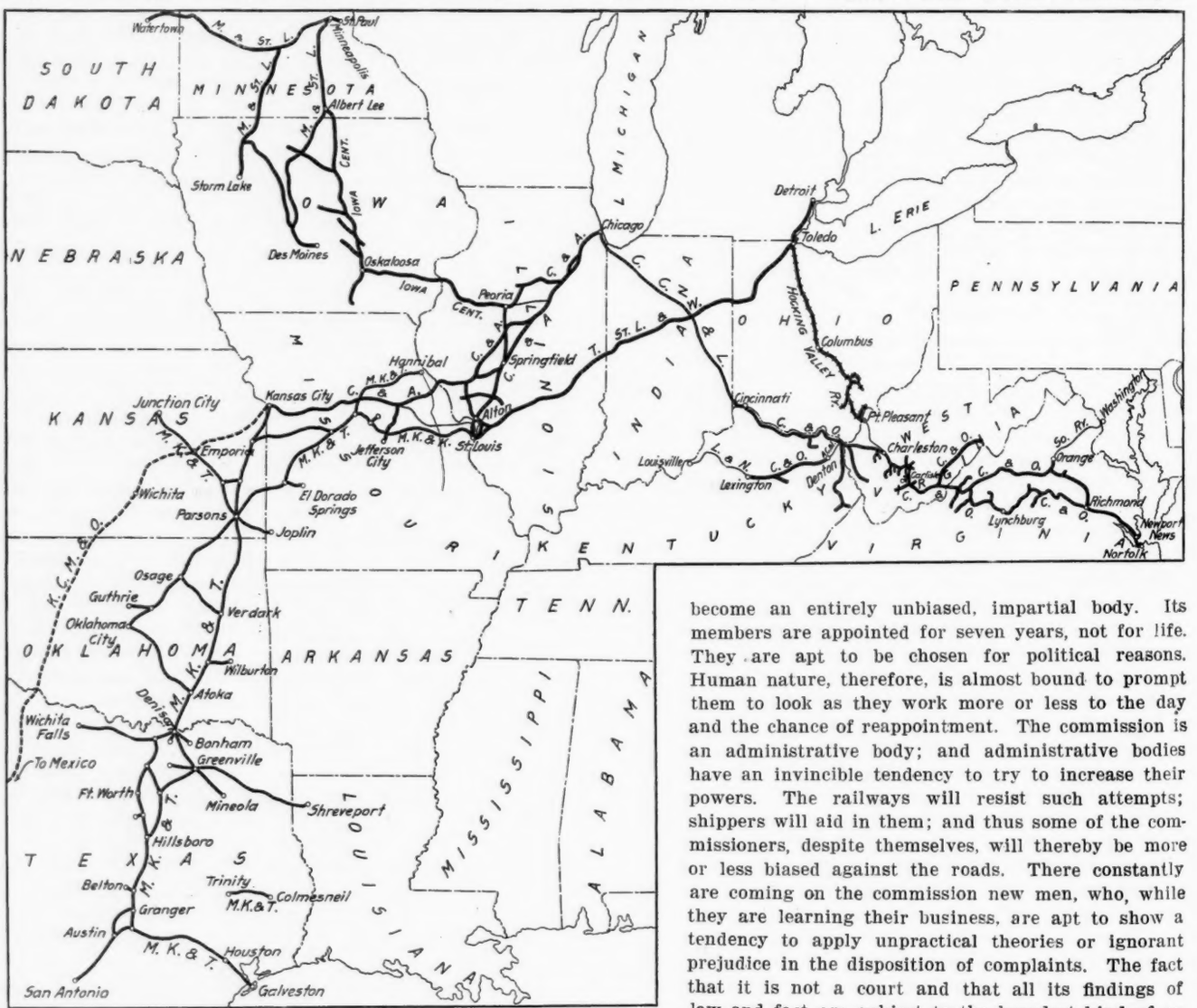
The addition of the Missouri, Kansas & Texas to this group has no apparent bearing on the affairs of the Chesapeake & Ohio end, but fits in admirably with the Clover Leaf and the Alton and, to a less extent, with the traffic needs of the two small granger roads. The Missouri, Kansas & Texas is an excellent railway, which has been handled with great skill through a series of years when its credit was poor and its traffic none too great. By the extraordinary growth of the Southwest, and particularly of the very sections of the Southwest through which the M., K. & T. passes, it has attained a position of great importance and its traffic is exceedingly well diversified, showing large increases along all lines. Yet it is not apparent that the Hawley system can throw any large amounts of additional traffic over this road. The advantage is apt to work the other way, and the comparatively short line of the Alton appears to be the only direct and important beneficiary. Much the same thing is true of the relations of the Kansas City, Mexico & Orient with the rest of the Hawley system. The direct traffic contract is with the Alton, and it will require a roundabout and rather incomprehensible routing of freight if the other lines in the system are to profit by it heavily.

There are two objects in welding together a group of railways into a system; one is to acquire mutual benefit through exchange of traffic which would otherwise move in different channels; the other is to consolidate operating, mechanical, traffic, engineering and purchasing departments, so that a staff of the highest skill and efficiency can give its extremely valuable services to all the lines alike, the result being one extremely good headquarters staff instead of a dozen weak ones. At present, the Hawley group of roads does not appear to possess either of these elements of strength. From a traffic standpoint, it is obviously divided into two parts—the lines east of Chicago and the lines west of Chicago—and these parts do not seem to have any very natural affiliation for each other. Nor has there been as yet any consolidation of management and operation. It seems probable that majority control would have to be substituted for minority

	Miles.
*Missouri, Kansas & Texas	3,072
Chesapeake & Ohio	1,841
Minneapolis & St. Louis	1,027
Chicago & Alton	998
Kansas City, Mexico & Orient (mileage now open)	802
Iowa Central	558
Toledo, St. Louis & Western	500
Chicago, Cincinnati & Louisville	283
	9,081

control before any general amalgamation can take place at headquarters; at present the control is that of friendly owners rather than of direct holding, and such direct holding as is done is divided between several holding organizations; thus, the Chesapeake & Ohio controls the C., C. & L., the Clover Leaf controls the Alton, and the Alton in turn has a traffic contract with the Orient road. In this respect, there is a certain analogy betweeen the organization of the Hawley system and of the Gould system, but the Gould organization, with all its grave defects, has the advantage of controlling through majority holdings, by the men who are joint owners.

Taking all these facts into consideration, the Hawley group still looks chiefly like a collection of individual properties, bought to sell again. But, although there is nothing in the past history of the Hawley operations to make the situation appear different from this, there are several present facts of great importance which may change this condition entirely. One is the physical link supplied by control of the Chicago, Cincinnati & Louisville. Another is the obvious harmony of working which can be effected between the Chicago & Alton and the Missouri, Kansas & Texas. Mr. Hawley has moved rapidly in his selection of independent roads, and he has selected good ones; it remains to be seen what use he will make of them.



The Hawley System.

The Kansas City, Mexico & Orient is affiliated only by traffic contract with the Alton.

The Chesapeake & Ohio owns a one-sixth interest in a majority of Hocking Valley common stock.

AN INTERSTATE COMMERCE COURT.

President Taft favors the establishment of an accusatory bureau in the department of justice to institute prosecutions for violations of the interstate commerce law and the anti-trust law and the creation of an interstate commerce court of five members, to which all appeals from orders of the commission shall be made. We stated in our issue of September 24, page 529, some reasons why the prosecuting function of the commission should be transferred to a special bureau. The argument for the creation of a special interstate commerce court is also very persuasive.

Even though relieved of its duties as a prosecutor, the commission cannot be expected, under present conditions, to become an entirely unbiased, impartial body. Its members are appointed for seven years, not for life. They are apt to be chosen for political reasons. Human nature, therefore, is almost bound to prompt them to look as they work more or less to the day and the chance of reappointment. The commission is an administrative body; and administrative bodies have an invincible tendency to try to increase their powers. The railways will resist such attempts; shippers will aid in them; and thus some of the commissioners, despite themselves, will thereby be more or less biased against the roads. There constantly are coming on the commission new men, who, while they are learning their business, are apt to show a tendency to apply unpractical theories or ignorant prejudice in the disposition of complaints. The fact that it is not a court and that all its findings of law and fact are subject to the broadest kind of review in original proceedings in the federal courts, also, no doubt, has tended to cause it to render some decisions that no court would have rendered, and to cause the railways to treat it and its findings with less respect than they pay to the federal courts and their decisions.

Appeal may be taken now from an order of the commission to any United States circuit court. The federal courts have not the same defects for passing on rate cases as the commission, but they have others almost as bad. The life tenure of judges makes them much less subject to the influence of popular prejudice or passion. They have none of those duties of the prosecutor that inevitably have tended in the past to give the commission an anti-railway bias. But the ordinary federal judge has no special knowledge of rail-

way matters. He has no opportunity to acquire it. Probably there are no two federal judges in the country who have a tithe of the knowledge of railway traffic matters that is possessed by Chairman Knapp and Commissioner Prouty. A single rate case may involve more than all the other cases that a federal judge tries in a year; but he can give to it only a relatively small amount of his time. The consequence of all these things is that the federal courts, while disposed to be fair, are apt to decide rate cases of the greatest moment on technical points of law instead of on the fundamental juridical and economic principles involved; and we go through year after year and decade after decade of railway litigation without seemingly getting any nearer to a settlement of the basis on which railway rates ought to be and are to be regulated. The fundamental question involved in every controversy, and in every litigation over rates is, "What is a reasonable rate?" No shipper can attack a rate or a schedule, no railway can defend it, no commission or court can pass on it, without raising or tacitly or avowedly passing on this question. Yet in all the decisions of the commission and in all the decisions of the courts in railway cases, there cannot be found anything approaching a comprehensive and definite answer to this vital question. The circuit courts often have rendered absolutely contradictory decisions. The roads have been required to obey the law when the courts differed as to what it was. The courts often have blocked the path of both commission and railways, particularly the former; but they have given few useful positive hints or suggestions as to what path legally may be taken in the making or regulating of rates.

Some body is needed which shall combine the expert knowledge of railway matters that members of the Interstate Commerce Commission acquire, when they are left on the commission long enough, with the legal knowledge, the impartiality, the freedom from the influence of popular passion and clamor of the federal courts. A court such as Mr. Taft suggests, whose members would be appointed for life, would meet this need. It would relieve the other federal courts of a mass of litigation with which they are not equipped to cope, and probably would settle by an intelligent, consistent, authoritative series of precedents many of the doubtful points that give rise to much of the prevalent controversy and litigation. It should be able to aid materially in the solution of the "railway problem."

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA.

The Chicago, St. Paul, Minneapolis & Omaha is controlled by the Chicago & North Western and is a North Western line, both in location and in general policy of management. The main line of the Omaha road runs from Duluth through Minneapolis and St. Paul to Omaha. This forms a north and south line connecting up the western ends of the various lines of the Chicago & North Western, which extend fanwise out from Chicago. It is a road which has shown very steady earning power. Since 1893 it has paid dividends of 7 per cent. yearly on the preferred stock, and in 1897 an initial dividend of 2 per cent. was declared on the common stock. Since 1905 7 per cent. has been paid on the common. Even as compared with such roads as the North Western itself, the Omaha road is lightly capitalized per mile. Its outstanding stock is at the rate of less than $20,000 per mile and its outstanding bonds at the rate of a little over $17,000 per mile, making a total of about $37,000 per mile. The North Western has outstanding approximately $16,300 stock per mile and $21,700 bonds, or a total capitalization of about $38,000 per mile.

During the fiscal year ended June 30, 1909, the improvement in gross earnings was steady, and the greater part of this gain in gross was saved for net. Total operating revenues amounted to $13,500,000 in 1909, an increase over the previous year of $700,000. Total operating expenses amounted to $8,800,000 in 1909, an increase of $340,000 over 1908. This left net operating revenue of $4,700,000 in 1909 and $4,400,000 in 1908.

Passenger revenue furnishes a greater proportion of the Omaha road's gross than is the case with most of the other roads in its territory. Last year the revenue from passengers amounted to $3,990,000, an increase of 8 per cent. over the previous year, and the number of passengers carried one mile amounted to 205,200,000, an increase of 10 per cent. The average rate per passenger per mile is fairly high. It amounted to 1.945 cents last year as compared with 1.979 cents in 1908.

Freight revenue was $8,600,000 in 1909, an increase of 4 per cent., and the number of tons of freight carried one mile was 955,400,000 last year, an increase of 3 per cent. The average revenue per ton per mile was 0.903 cents in 1909 and 0.891 cents in 1908. The average train load increased about 5.5 per cent. and was 245 tons in 1909.

The increase in operating expenses was divided among all classes of expenses. Conducting transportation cost $5,000,000 last year as against $4,900,000 the previous year. Maintenance of way cost $1,600,000 as against $1,590,000 the year before, and maintenance of equipment cost $1,600,000 as against $1,500,000. The following table shows the unit costs of maintenance:

	1909.	1908.
*Maintenance of way	$903	$987
†Repairs per locomotive	$1,595	$1,548
" " passenger car	449	433
" " freight car	32	33

*Per mile of first and second track, no figures being given for the number of miles of sidings and switch tracks maintained.
†Repairs only, no account being taken of renewals, depreciation or superintendence charges.

The charges for repairs to locomotives and to passenger cars are not high, but are ample. The charges for repairs of freight cars appear to be considerably below what most roads find it necessary to spend on this account. The company, under the classification prescribed by the Interstate Commerce Commission, makes a charge for depreciation, in 1909, on locomotives of $98,000; on passenger cars, of $20,000, and on freight cars, of $190,000. This, together with the charges for renewals, made a total credit of $406,000 to the fund for equipment replacement. The total credit to this account on June 30 was $800,000. This includes the balance to the credit of the account brought over from previous years. During the year 12 locomotives and 500 box cars were bought at a cost of $500,000, so that the balance unexpended credited to equipment replacement June 30, 1909, amounted to $300,000.

The fund for improvements amounted to $180,000 at the beginning of the year, and all of this was spent except about $70,000. There was no charge made during the year to income account for additions and betterments.

The following table gives a comparison of the operations of the company in 1908 and 1909:

	1909.	1908.
Average miles operated	1,734	1,725
Freight revenue	$8,627,853	$8,276,781
Passenger revenue	3,990,945	3,690,484
Total operating revenue	13,524,650	12,840,369
Maintenance of way	1,613,784	1,585,380
Maintenance of equipment	1,577,831	1,507,268
Traffic	266,402	235,916
Transportation	5,000,766	4,860,076
Total operating expenses	8,831,229	8,487,240
Taxes	641,167	630,745
Operating income	4,050,542	3,734,248
Gross corporate income	4,173,606	3,950,764
Net corporate income	2,262,240	2,105,054
Dividends	2,086,910	2,086,910
Surplus	157,330	18,144

SOUTHERN RAILWAY.

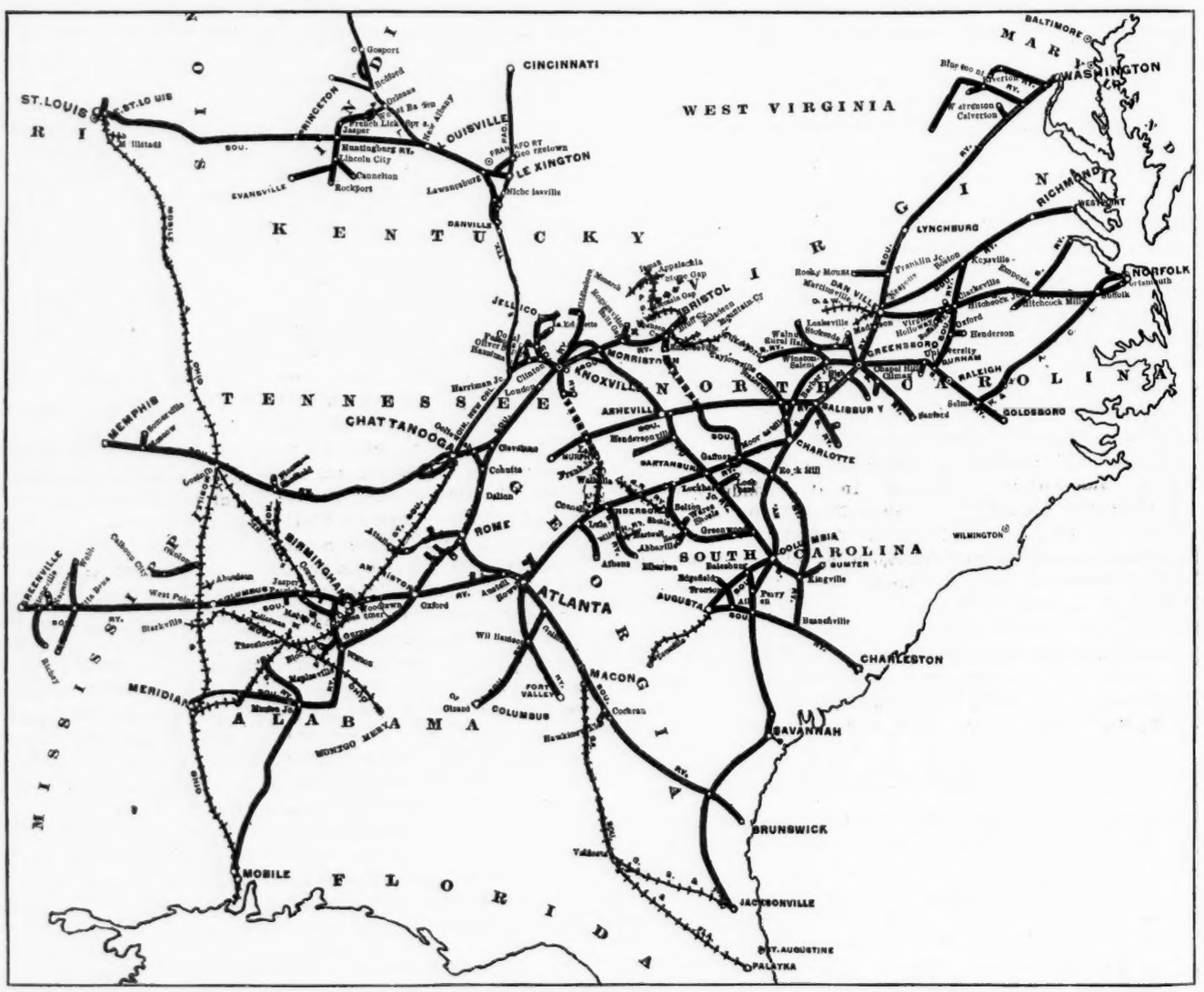
The Southern Railway, one of the great railway systems of the country, has had a particularly hard pull to get itself into shape for profitable operation. The company operates more than 7,000 miles of line, covering the southern states and extending as far west as the Mississippi river. The system was built up by the consolidation of a great number of small

lines, many of them built exceedingly cheaply, and through territory that is only now beginning to be profitable for a railway to operate in. The Southern has had a succession of difficulties to overcome that at one time seemed to be on the point of overwhelming it.

Labor in the South, while cheap, is inefficient, especially in train operation, and particularly hard to impress with a respect for authority and the meaning of discipline. Southern trains were late because the labor that was available for train crews, despatching, etc., did not have a sense of time value. This inefficiency was probably the first and one of the most difficult problems in the actual operation of the road.

In 1907 the South was more prosperous than at any time since the civil war; consequently there were heavy increases in the volume of traffic offered to the railways and their facilities were overtaxed. For instance, gross earnings of the Southern in 1907 were $56,700,000, an increase over 1906 of about $3,000,000, while expenses and taxes were $44,000,000 in 1907, an increase of nearly $5,000,000 over 1906, so that the company earned net about $2,000,000 less in the year of great prosperity that it did in the previous year. The management recognized that improvements were necessary to handle the volume of traffic, that second track was needed at many places, and that more equipment should be put in service, but they were hardly left to their own judgment as to how rapidly it was possible to make these improvements with a proper regard to the financial condition of the company. Public opinion as expressed in the legislature and the press demanded instant improvement. The South was becoming an industrial and manufacturing territory and it was necessary for the southern manufacturers to compete with manufacturers served by such a road as the Pennsylvania. Every effort was made to get the Southern property into shape to handle increased business. To do this it was necessary to sell new securities.

At the very time that the company was looking for a purchaser for its bonds, the panic struck the country. Earnings of all railways fell at an alarming rate, and in the meantime the Southern's expenses were left way up in the air. The problem now became one of raising money at almost any cost. Where it was possible, short term notes were sold, but for a time at least it seemed as if the credit of the company had been completely undermined.



Southern Railway.

The Southern does not operate the lines shown crosshatched, but has an interest in them.

During the fiscal year ended June 30, 1909, the Southern was able to sell, at a rather heavy discount, about $24,000,000 development and general mortgage 4 per cent. bonds, and with the proceeds retire short term notes, equipment obligations, and make some appropriations for improvements and betterments. There was charged off during the year $500,000 to income for discount on securities sold, and $3,200,000 to profit and loss for discount. This, added to the sums charged for discount in previous years, makes a net discount on securities sold up to June 30, 1909, of $7,800,000. The advantage of getting the debt funded for a long term is apparently well worth what it costs. Some readjustment was

necessary, and the way in which it was done was unquestionably less expensive than would have been a receivership.

In efficiency of operation the company made great advances over the bad showing in 1907 and the disappointing showing in 1908. Total operating revenue amounted to $52,200,000 in 1909 as against $52,900,000 in 1908, and operating expenses amounted to $35,600,000 in 1909 and $39,900,000 in 1908. On June 30, 1908, the Tennessee Central, 217 miles, was turned over to its owners, and the Southern Railway and the Illinois Central, which had been operating it jointly, decided not to exercise the option that they had on the property. The Southern Railway in Mississippi, 281 miles, operated by the Southern Railway up to January 1, 1909, was operated separately after this date. Gross earnings, therefore, in 1909 are not directly comparable with the 1908 gross, because in the former year the company was operating considerably more mileage than in 1909. The total results, however, of operation of the Southern Railway for 1909 are comparable with the operations as a whole for 1908, since expenses and rentals must also have decreased when the company ceased to operate the Tennessee Central and the Southern Railway in Mississippi.

Freight earnings amounted to $34,400,000 in 1909 and to $34,200,000 in 1908. There were 3,600,000,000 tons of freight carried one mile in 1909 and 3,400,000,000 tons carried one mile in 1908. The average length of haul was 163 miles last year and 153 miles the previous year, and the average receipts per ton per mile were 0.952 cents in 1909 and 0.974 cents in 1908.

The number of passengers carried one mile was 623,000,000 in 1909 and 605,000,000 in 1908, the average revenue per passenger per mile being 2.170 cents in 1909 and 2.294 cents in 1908.

Of the total decrease in operating expenses, 56 per cent. was in transportation expenses. In 1909 conducting transportation cost $18,300,000; in 1908, $20,800,000. Maintenance of way cost $6,000,000 in 1909 and $7,100,000 in 1908. Maintenance of equipment cost $8,200,000 in 1909 and $9,100,000 in 1908. The following table shows the unit costs of maintenance:

	1909.	1908.
*Maintenance of way	$760	$801
†Repairs per locomotive	1,740	1,844
" " passenger car	557	704
" " freight car	50	54

*Per mile of first, second, third, etc., track operated, two miles of siding and switch track being counted equal to one mile of main track.
†Does not include renewals, depreciation or superintendence charges.

The unit figures for maintenance in 1908 are not high, and in 1909 they were cut rather deeply. It is not fair, however, to compare either the maintenance charges or the sum spent for additions and betterments on a road lying in the territory covered by the Southern Railway and the same figures for a road lying in the East or North. The country simply cannot support a high-standard railway; moreover, the branch line mileage of the Southern Railway is very large as compared with its main line mileage, and the maintenance of these branch lines can be, and ought to be, done cheaply. Many of the branch lines are in poor territory, which is now getting better railway facilities than it is as yet able to support, and, pending the growth of the country, as little as possible must be spent on this unproductive mileage. The Southern Railway is, on the whole, rather better maintained than most other roads in its territory. The Atlanta, Birmingham & Atlantic, in receivers' hands, shows what happens to roads that build too expensively in the Southeast.

Last year the Southern spent $1,800,000 for additions, charging all but $78,000 of this to capital account. The total payments for equipment during the year were $3,100,000, of which $2,200,000 was charged to capital account and the remaining $900,000 to replacement account. This represents the payment on account of equipment trusts canceled and does not represent the payment for any equipment in addition to what the company now has the use of. There was no rolling stock added to what the company had in service June 30, 1908. On the other hand, the number of all classes of equipment in service was less at the end of the year than at the beginning, partly because of the equipment returned to the Tennessee Central, and because some equipment was condemned, destroyed or sold during the year. There were 55,079 freight cars in service June 30, 1908, and during the year there were destroyed or sold 1,891, leaving, after the return of the Tennessee Central equipment, 52,689 cars in service June 30, 1909.

President Finley, in concluding his remarks, says:

"More than conventional acknowledgments are due by the board and the security holders to the officers and employees of the company for their work during the past year. Not only have they been faithful in the discharge of their assigned duties, but they have been infused with a new spirit of enthusiasm in the interests of the company, which are indeed their own interests. Co-operation between departments has been marked, while never before has there been such evidence of the loyalty of employees in all ranks of the service. This is the fruit of that greater efficiency of labor on which there cannot be laid too serious stress in estimating the results already obtained and the prospects for the future."

The results of operation emphasize these remarks. The operating ratio, including taxes, was reduced from 74.79 per cent. in 1908 to 68.16 per cent. in 1909. The total transportation cost per revenue train-mile was 62.66 cents in 1908 and 60.75 cents in 1909. The loaded cars per train averaged 13.46 in 1908 and 15.19 in 1909. The average trainload was 192.27 tons in 1908 and 215.57 tons in 1909. Of the total tonnage carried, fuel forms 32.5 per cent., and products of forests furnishes 17.25 per cent. Cotton itself constitutes less than 2 per cent. of the total tonnage, but as there are approximately 2 lbs. of seeds to each pound of lint cotton, and since the manufacture of products from this seed is becoming an important industry in the South, the tonnage of the various products closely connected with cotton forms 7.23 per cent. of the total tonnage. More than 70 per cent. of the revenue freight carried by the Southern was produced in the South, and President Finley points out that the South is no longer a mere producer of raw materials. The textile industry spun and wove 18 per cent. of the last cotton crop and the Southeern Railway handled 61 per cent. of the manufactured product. The tonnage of merchandise traffic exceeds the tonnage of cotton and its entire products, and the combined tonnage of merchandise, manufactures and miscellaneous freight furnished about 17 per cent. of the total tonnage last year.

While there is no prospect of immediate great increase in gross earnings without a corresponding increase in operating expenses and in traffic congestion, the Southern Railway has, apparently, in the past year turned the corner in its struggle against difficulties, each of which made the others more intense. The company has now got its department in manageable shape, its operating forces well in hand, and can look forward to making improvements that will make its property in time able to handle the great volume of traffic that is bound to come with the industrial development of the South.

The following table gives a result of the operations of the company for 1908 and 1909:

	1909.	1908.
Average mileage operated	7,170	7,136
Freight revenue	$34,376,619	$34,171,329
Passenger revenue	13,510,791	14,315,961
Total operating revenue	52,188,107	52,941,717
Maintenance of way	6,016,661	7,109,173
Maintenance of equipment	8,193,753	9,138,378
Traffic	1,252,328	1,300,233
Transportation	18,348,507	20,773,253
Total operating expenses	35,568,981	39,854,722
Taxes	1,916,702	2,027,967
Operating income	14,839,388	11,080,290
Gross corporate income	17,737,699	13,846,967
Net corporate income	3,589,385	401,850
Additions and betterments	78,285	122,707
Surplus	3,511,100	279,143

Letters to the Editor.

BIG TRAINS ON THE VIRGINIAN.

Norfolk, Va., Oct. 13, 1909.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

Various items have appeared in the daily press concerning trains—some of them rather fabulous—that have been handled on the Virginian Railway. I think it would be interesting to the *Railroad Age Gazette* to have a record of a train which I happen to have before me, and I send along with it a photograph of the engine and train. There is a caboose on the rear end of it, which can be noticed by very close inspection of the photograph. This train consists of one of our Class MB Mikado engines, 24 x 32 cylinders; 56-in. driving wheels, carrying 190 lbs. of steam; weight on drivers, 207,450 lbs.; on front trucks 20,850 lbs.; on trailing truck 25,700 lbs. The weight of tender when loaded with 9,500 gals. water and

Big Train on the Virginian. Weight Behind Engine, 7,562 Tons. Coal Carried, 5,500 Tons.

16 tons of coal—173,000 lbs. Total heating surface, 4,466 sq. ft.; 51 ft. grate area. Total length of engine, 73 ft. 8 in. The train consisted of 100 Virginian Railway Company's steel coal cars 43 ft. long over couplers, equipped with K-2 triples, loaded with coal. The total weight of the train behind the engine was 7,562 tons—cars carrying almost exactly 5,500 tons of coal, and a caboose weighing 18 tons. The caboose is about 30 ft. long over couplers. The train was made up in the ordinary way, inspected and turned out without any special preparation. The engine arrived in Victoria terminal between 8 and 9 o'clock at night, and was coaled and left at 4 o'clock next morning. The engineman and fireman called were the first on the slate to go out. The engine has been in service since last May without anything but the smallest amount of running repairs. Train left Victoria 4.23 a.m., and arrived at Sewall's Point at 1.05 p.m. same date, a distance of 124.8 miles, making three stops for water and passing two trains on the road. The grade run, of course, is easy; but there are a number of opposing grades which are too long for momentum grades. These grades are about 10 ft. to the mile. It was necessary to take a good deal of slack to get the train in motion, which, you will appreciate, means that the couplers and draft gear have to be of the best.

The writer rode this engine for the entire trip, and watched the performance of the engine and the action of the brakes on a long train of this make-up, with one of the representatives of the Westinghouse Air Brake Company. There was not a hitch in the whole run. It might interest you also to know that the brakes acted perfectly, and it was never necessary to make an application of more than 10 lbs.

R. P. C. SANDERSON,
Superintendent of Motive Power, Virginian Railway.

THE RAILWAY BUSINESS ASSOCIATION.

New York, October 19, 1909.

TO THE EDITOR OF THE RAILROAD AGE GAZETTE:

The Railway Business Association will hold its annual meeting at the Waldorf-Astoria Hotel, New York, on November 10, 1909. This will be a very important occasion, which it is proposed to conclude with a notable dinner, having among the guests eminent leaders in the railway, manufacturing, commercial and political worlds.

If the association is to be made a permanent economic force, which many of those deeply interested in railway and allied interests have vigorously declared should be done, then there is need of a large representation of its membership and a full and careful consideration of the best means for enlarging its usefulness. The more people who are actively interested in its work, the greater will be its influence, and it is most desirable that if, in the opinion of any of its members, its plan and scope should be broadened or its methods changed, the annual meeting be made the place for consideration of all such matters, to the end that enthusiasm may prevail and all may feel that they are important factors in the movement.

The dinner, it is now assured, will be attended by one of the most distinguished of gatherings, since the members of the association, themselves an influential group of industrial captains, will have as their guests celebrated railway officials, financiers, men of commerce and publicists. The dinner, moreover, will have a purpose—for the addresses of the national figures who are to speak will be a sort of symposium of assurances to the public that all concerned are earnestly seeking to promote permanent concord between public and railways, and prosperity for both.

So important is this meeting that every member of the association ought to be represented and participate in the proceedings, and everyone who has the opportunity to attend the dinner should arrange to do so.

GEORGE A. POST,
President.

THE HUDSON AND MANHATTAN TUNNEL SYSTEM.

BY J. VIPOND DAVIES.

VI.

TRACK.

Generally speaking, the standard track throughout all the lines of the company consists of white oak ties, laid in broken trap rock ballast on a flat surface of concrete forming the invert. This concrete invert fills the flanges between the plates in the tube tunnels and a drain is formed with a reinforced concrete slab over the same along the center line of the tunnel, which provides efficient drainage of the tunnel.

The rails are 85-lb. A. S. C. E. section with Continuous rail joints, and all rails are attached to the ties with screw spikes of special design for this company's work. Goldie tie plates are used throughout, the plates being put on the ties under hydraulic pressure before the ties are sent into the tunnels, the plates being put in to exact template spacing. Holes in the ties for the screw spikes were bored with a pneumatic auger before the ties were taken into the tunnels, and the screw spikes put in place and driven with a pneumatic screw driver which proved very rapid in operation and of great efficiency. This tool was designed by officers of the company for the particular use to which it was put.

All the rail used in the downtown tunnels has been 0.90 per cent. carbon manufactured by the open hearth process by the Bethlehem Steel Company, and on heavy curves either chrome nickel or manganese rail was used, according to the radius of curvature.

The contact (third) rail is of special type, designed by L. B. Stillwell, the company's consulting electrical engineer. This rail is carried on heavy porcelain insulators, and secured by pressed steel brackets to long ties spaced about 10 ft. apart. The contact rail is protected by an overhanging board of Australian jarrah wood.

Signal and Automatic Stop.

At heavy curves and in the downtown terminal, as well as at special points where reinforcing was executed, the track was laid in solid concrete.

Guard rails are installed on all curves of less than 750 ft. radius, these rails being 100-lb. section A. S. C. E. and 9-16 in. higher than the running rail.

All frogs and switches are of manganese steel.

DUCTS.

Electric ducts are carried throughout all tunnels in such number as is needed by the electrical department, but arranged

in all cases in internal benches within the lining of the tunnels. The right hand bench wall in the direction of train movement carries all interferences of every kind, signals, air pipe lines and pump discharge lines, etc., leaving the left nand bench wall clear for employees or for a walk-way for persons in case the necessity arises. The ducts throughout are vitrified tile ducts, 3½ in. square, with rounded corners and grouped between manholes as most convenient in each particular section of the tunnels.

SIGNALS.

The signal system throughout is arranged for operation of eight-car trains on headway of one and one-half minutes in either direction and on all lines. The signals throughout are arranged with the double overlap and there is a full equipment of automatic train stops.

On the uptown line, between Hoboken and Twenty-third street, New York, the signal installation was by the General Railway Signal Company, and consists of an all-electric system with the Kinsman electric-motor operated train stops and electrically operated visual sipnals. The interlocking plants in this installation are also electrically operated, and illuminated track models are installed at each interlocking tower.

For the downtown work, however, the installation was made by the Union Switch & Signal Company, and the equipment is electro-pneumatic, including the train stops. An illuminated track model at the Church street terminal indicates the entire movement in both tunnels between the Pennsylvania station, Jersey City, and the Church street terminal, New York. A similar model at the Pennsylvania station indicates all diverging and converging routes at the Pennsylvania station and the movement westbound from the Church street terminal, but does not indicate the eastbound movement after trains clear the Pennsylvania station.

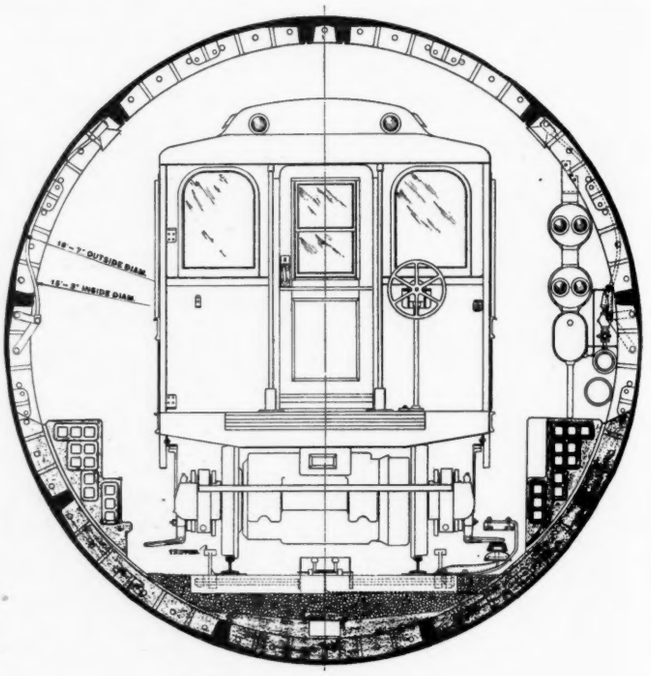
VENTILATION.

The general principle adopted throughout for the ventilation of all tunnels is for the removal of air forced through by the trains under the piston effect in advance of trains and forcing in fresh air behind a retreating train. These ventilating plants are installed at points of junction between tubes, where the air would otherwise mix or short circuit. For this purpose there are ventilating plants arranged as follows:

Ninth street. There is a suction and blower plant arranged for this junction.

Christopher and Greenwich streets. There is a blower plant at sub-station at this point.

Morton street. There is a suction plant drawing out air from the eastbound tunnel at the foot of this street, with an uptake through a shaft to the street surface.

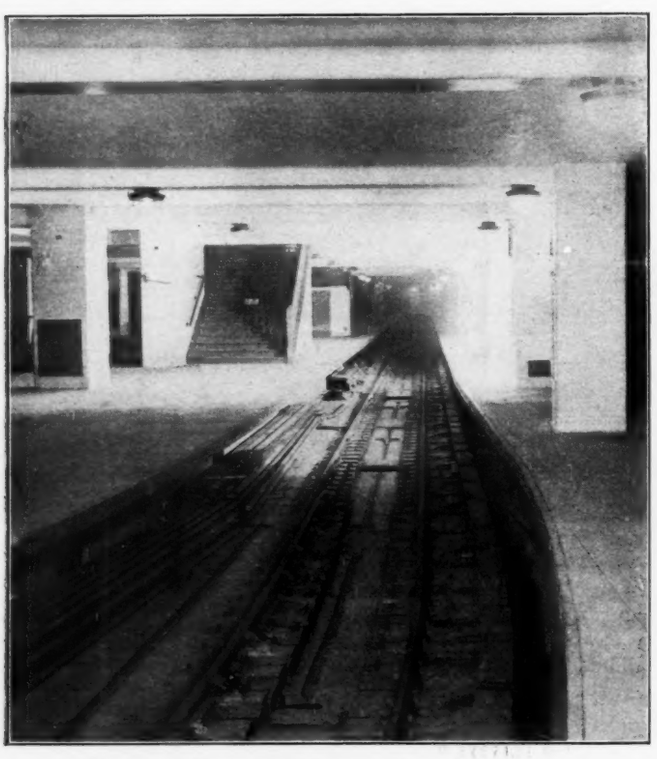


Signal and Automatic Stop.

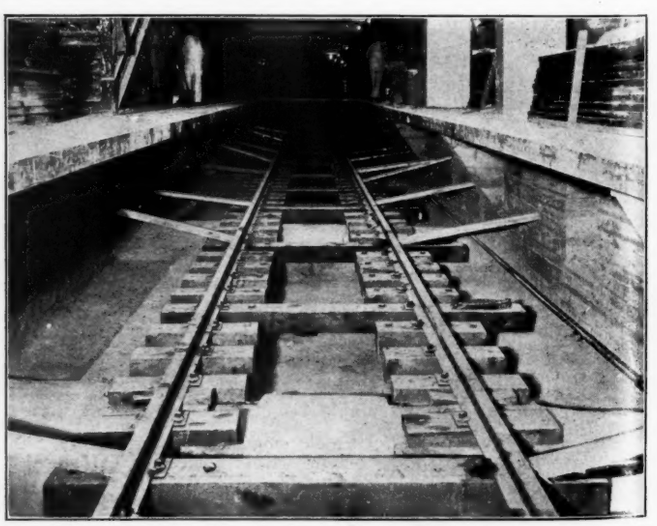
Fifteenth street, Jersey City. At this point there is a suction fan installed exhausting air from the westbound tunnel from New York.

Hoboken terminal. There is a fresh air blower plant at this location supplying air into the southbound (also eastbound) tunnel.

Church street terminal. At this point there is a suction and blower plant. The suction plant draws the air out of the eastbound tunnel below the tracks, discharging into the open air, and the blower plant exhausts air out of the center of the terminal station and forces air into the westbound tube in the rear of departing trains.



Finished Track at Church Street Terminal.



Track at Church Street Terminal under Construction.

This system of ventilation, as carried out with the tube system, has proved thoroughly efficient.

WATERPROOFING.

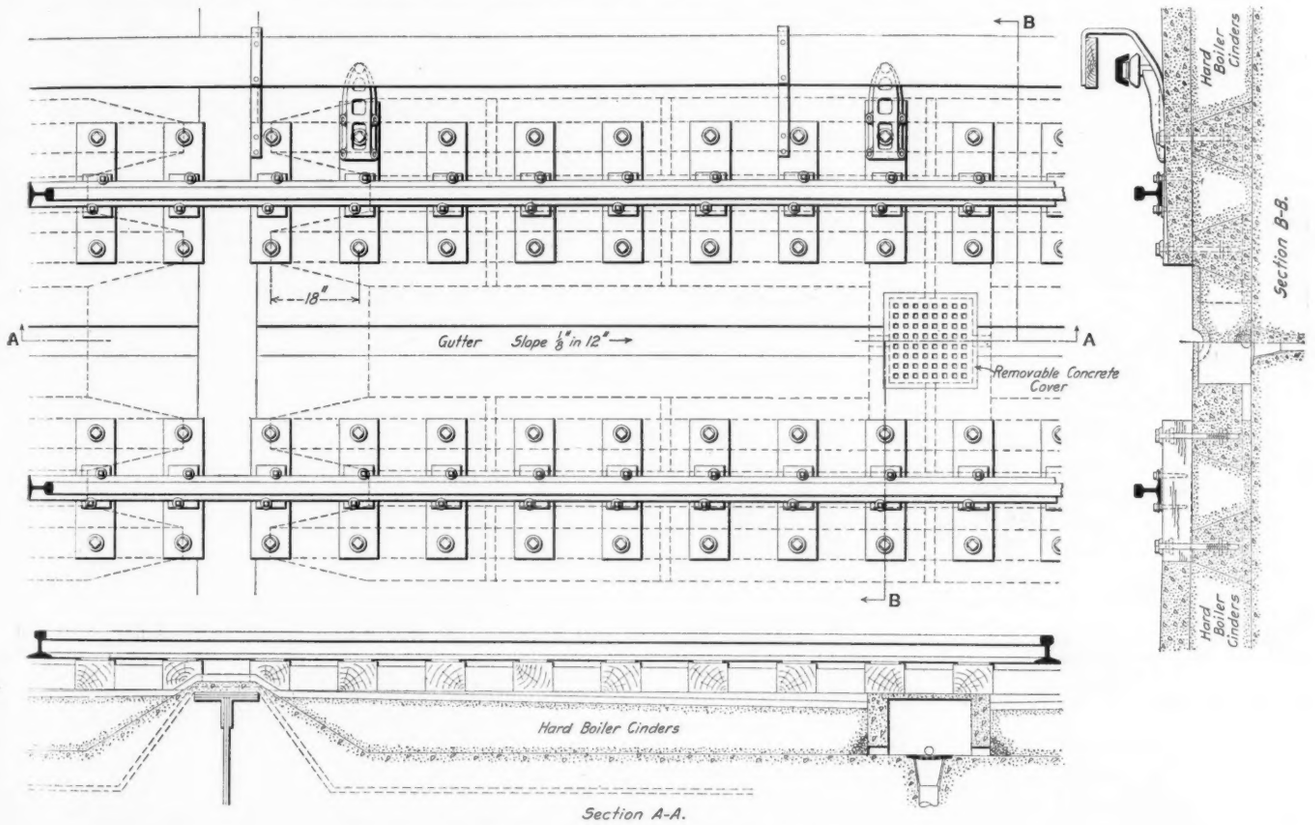
Wherever work is executed by open-cut methods the structure is waterproofed with fabric and pitch applied in the usual manner, making a complete envelope around the structure. As the greatest part of this work, however, was executed by tunnel methods this manner of waterproofing was not feasible, excepting in small portions of the work. The method, therefore, adopted was invariably to grout with Portland cement in the rear of the plate lining or concrete lining, and in the majority of cases this application answered the purpose of making the tunnels perfectly watertight. Owing to the imperviousness of neat cement this was the only waterproofing adopted on the coffer dam walls on the Church street terminal and approaches. In the iron-lined sections of tunnel all joints of the plate segments were first grummeted on the bolts with flax and red lead under the bolt washers, and caulking spaces between the joints of the plate lining were first caulked with a thread of lead wire, followed up and supported with rust joint cement. Throughout the concrete work waterproofing was done by plastering on the internal and exposed surface with one of the usual types of waterproofing compounds mixed with neat Portland cement and applied with a trowel, this method answering admirably in a majority of cases. At the same time, in persistent leaks, it was found necesary to cut right back into the concrete and expose the voids and then reconstruct such portion of concrete with a rich mixture of cement. As a general rule, for waterproofing of concrete work a rich mixture of cement in the concrete with thorough and efficient ramming has answered the purpose and constituted the only waterproofing used.

INSTRUMENTAL WORK.

The laying out of the work in the field, owing to the construction being entirely underground, had to be carried out with wire lines extended from surface surveys to underground surveys.

Triangulation surveys across the river were carried out for the uptown lines, as well as for the downtown lines, and these triangulation surveys connected together and also joined up on either side by land surveys between. The location of the uptown tunnels enabled a complete quadrilateral to be laid out with base lines measured on both sides of the river, checking one against the other, and the underground surveys were carried through from a direct wire line joined in upon one of the base lines of the triangulation survey, the wire lines being on the direct surveyed line. This made the instrumental work for the uptown tunnels comparatively easy, and the lines extended all the way from New Jersey to New York joined within 1 in. in alinement.

On the downtown tunnels, however, the difficulties were very much greater. There are curves in the tunnel alinement at each end, so that direct lines from end to end underground were not possible. Further than this, at neither end was it possible to get the wire lines on the axis of either tunnel. At the New Jersey end one wire line was plumbed, using fine brass wire and heavy lead wing weights, oscillating in water baths at the vertical shaft at Pier C. A 10-in. pipe was driven down from the surface at Exchange place, Jersey City, into the cross-heading used for construction purposes and the other wire line plumbed through that pipe. This constituted the base line from which the surveys were carried underground.



Track at Church Street Terminal.

On the New York side, similarly, wire lines had to be plumbed down at different points in the streets on a line turned from the triangulation survey, and the direction of the underground surveys had to be calculated to give the direction for the underground survey lines. This extremely difficult piece of work was carried out by two independent corps working at different times and checking each other, and their work was so accurate that the first tunnel driven through (south tunnel) joined within 0.16 ft. in line and 0.004 ft. in grade.

All these surveys were carried on at night on account of the reduced interference by outside conditions and the better at-

mosphere in which to carry on the surveys. In addition to this, all base line measurements were carried on at night, as the more uniform temperature at that period of the day also added to the accuracy of the work.

ORGANIZATION.

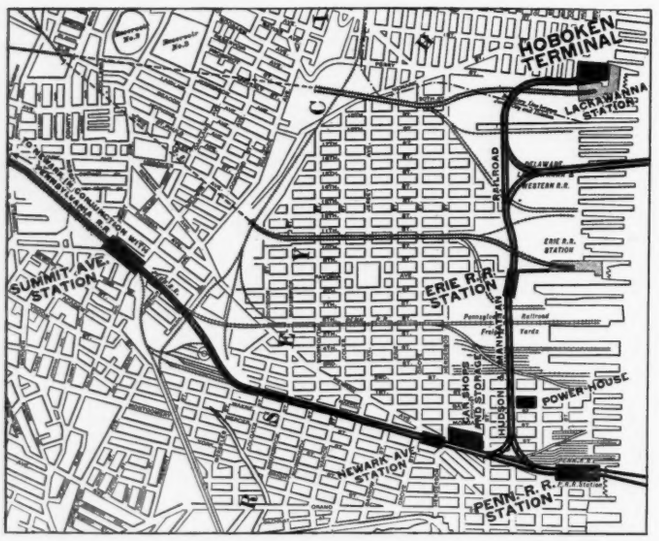
Since the year 1902, when the work was taken over by the present company, it has been executed with the company's own organization.

The president of the Hudson Companies is Walter G. Oakman, and the vice-president and treasurer, William Henry Barnum.

The president of the Hudson & Manhattan Railroad Company is William G. McAdoo, and the vice-president, Wilbur C. Fisk.

The chief engineer of both the Hudson Companies and the Hudson & Manhattan Railroad Company was Charles M. Jacobs, and the deputy chief engineer, J. Vipond Davies. These gentlemen are of the firm of Jacobs & Davies, Inc., consulting engineers.

The staff was divided into two general departments—engineering and construction—both reporting directly to the chief engineer and the deputy chief engineer.



New Jersey Lines; Hudson & Manhattan.

Showing western portion of system, including Summit avenue extension. This will run under the Pennsylvania tracks to Summit avenue, at which point it will come to the surface and the tunnel trains will run over the Pennsylvania to Newark. This extension was mentioned in the first instalment of this article, appearing in our issue of September 17.

The engineering department had at its head the principal assistant engineer, whose staff consisted of an engineer of design, a chief draftsman, three division engineers with the necessary corps of assistant engineers, resident engineers, instrumentmen, rodmen, chainmen, inspectors, etc. This department was charged with the design, survey, inspection, setting out, estimates, records, etc.

The construction department was divided into five divisions at the head of each of which was a works manager, and each works manager had a full staff consisting of a master mechanic, superintendents, assistant superintendents, chief electrician, electricians, walking bosses, foremen, mechanics, laborers, etc. This department had actual direction of the workmen, the ordering of materials and supplies, the operation of the power plants, etc.

The electrical installation and car equipment have been designed and constructed under the direction and supervision of Lewis B. Stillwell as consulting electrical engineer, with Hugh Hazelton as electrical engineer and John Van Vleck as mechanical engineer.

The project since the year 1902 has been financed to completion by Harvey Fisk & Sons, New York City.

RAILWAY SIGNAL ASSOCIATION.

The annual meeting of this association was held at the Seelbach hotel, Louisville, Ky., October 12, 13 and 14, about 300 members being present, together with 60 of their wives and daughters. The president of the association, L. R. Clausen, superintendent of the Chicago, Milwaukee & St. Paul, at Chicago, occupied the chair. In his opening address he spoke of the vigorous growth of the association which, on March 11, 1895, when it was formed at Chicago, had only six members. Now it has over 1,100. The receipts during the past year have been $5,326, and the expenses $5,284. The assets of the association are now $2,827 greater than the liabilities. The work done by the association within the past three or four years—the formulation of specifications for manual interlocking, for power interlocking, for wire and cables and on other subjects—has been important. The investigation of signaling practice by committee No. 1 has now reached a very interesting stage. Mr. Clausen expects a harmonious outcome, notwithstanding the fact, which we may mention in passing, that he himself is one of the stoutest opponents of some of the principal propositions of the majority of this committee. Mr. Clausen mentioned as prominent items in the task before the association in the immediate future the harmonizing of the conceptions of signalmen with those of other operating officers, in regard to some vital features of signaling; the further standardization of signal appliances and materials, and the investigation of the use of alternating currents in electric signal work. He warned the members against the tendency to approve new things not sufficiently tested. The critical watchfulness maintained over railways by municipal, state and federal governments is more exacting each year, suggesting the need of caution in all things affected with a public interest. It is to be hoped that the Railway Signal Association will be recognized as the final authority on all signaling matters, but to hold this position the association must be conducted with dignity and deliberation.

The secretary reported the membership one year ago as 1,096; added during the year, 193; total, 1,289. Resigned, 18; died, 5; lapsed, 127; net membership October 1, 1909, 1,139. The small net increase during the year is due to the fact that many signalmen have been out of work. With the increased activity of business these members ought to return.

The meeting adopted with slight changes the proposed amendments to the constitution, one changing the date of the New York meeting from the second Tuesday in May to the second Tuesday in June; one providing that the journal of the proceedings shall be published four times a year, and making the price of this publication two dollars; one requiring the executive committee to refer to the American Railway Association for approval the important conclusions, findings, standards, etc., adopted by the R. S. A., and one requiring the executive committee to prepare a manual of recommended practice, in which shall be published the specifications and standards of the association, and such findings and conclusions as in its judgment may be of sufficient importance to be so published. In the manual the approval of the American Railway Association shall be indicated in connection with any matters that have received such approval.

The most prominent subject considered by the meeting was the report of Committee No. 1, on signaling practice.

This report was printed in part in the last issue of the *Railroad Age Gazette*, and the last part of it will be found on another page of this issue. Below we give an abstract of the discussion on it. The reports of the other committees and the discussions thereon are crowded out by lack of space, and will be given next week.

The second day of the meeting, Wednesday, was practically all devoted to the discussion of the report of committee No. 1. Mr. Rudd, in presenting it, called attention to certain errors in the printing of the report. In exhibit No. 2 the "slow

board," shown as 13-C, should be 14-D. In exhibit No. 3, the same change should be made, the "slow board" being shown as 14-C; and the same in exhibit No. 4. In exhibit No. 5, aspect 18, the light should be lunar white. Referring to page 696 of the *Railroad Age Gazette*, exhibit 5, the aspect shown to the right of No. 18 is to indicate a switch in a siding or a yard normal, or a non-interlocking siding derail closed. The two aspects shown at the bottom of this column are: horizontal target and purple light, non-interlocked siding derail open; diagonal target and yellow light, switch in siding or yard reversed.

As the minority, in presenting their objections, offered no substitute plan, Mr. Rudd, chairman of the committee, moved that the report be accepted and sent to letter ballot. Mr. Rudd announced a brief addition to the report in the shape of a statement to the effect that, as a result of the letter ballot, it appeared that 149 members are in favor of further consideration of the merits of the upper left-hand quadrant semaphore, which was discussed at the New York meeting last June; and 108 not in favor.

He also said that the committee had received a report from Dr. A. G. Thomson on the characteristics of lunar white lights and the possibility of difficulties with them, in case the observer should be color blind. This report was not presented. In substance, it shows that the appearance of lunar white, as compared with red, green and yellow, is such that there would be no danger, even with a color blind observer.

In the discussion the first speaker was Mr. Stevens (A., T. & S. F.) for the objectors. If this report is adopted, those opposed to it will not be able to disturb it for a number of years, hence the association should adopt nothing that is not thoroughly sound. The interests of those who use disk signals must not be ignored. This association has never approved two-position signaling, yet thousands of such signals are in use, and they must not be ignored. The present is the first proposal of a declaration of principles ever made in this field; therefore, let us discuss it most thoroughly.

Mr. Rudd (Penn.), observing that the subject had already been discussed four years, called on Mr. Anthony to take up point No. 1 in the minority report. Mr. Anthony said that the proposition to use the 45-degree position to indicate the position of the next signal in advance was brought before the committee a year ago; it was referred to a sub-committee and considered in a thorough manner. This and the other principle, that the location of the arm on the post shall indicate speed, were adopted by the subcommittee, and this action was approved by a large majority of the full committee. Where has there been a lack of investigation? The majority of the members are thoroughly convinced, and the time has come for action.

Mr. Rudd.—Consider the time that members have spent in discussing this subject. During the past year Mr. Ingalls has spent ten days at meetings, Mr. Cable 18, Mr. Mock 20, Mr. Patenall 20, Mr. Stevens 22 and Mr. Anthony 28; and all of the members have spent much time on the subject, besides that devoted to meetings.

Mr. Stevens.—I have been on the committee from the beginning, but I have not heard adequate discussion of these two principles.

Mr. Clausen (C., M. & St. P.).—It is not true that the railways of the country are in practice giving the 14 indications which are proposed by the committee, and which it is claimed represent actual present practice. The article by Mr. Anthony in the *Railroad Age Gazette* of September 10 creates a false impression. The information given in the Standard Codes of the American Railway Association is largely for the compiler of rules, and is not to be treated as instruction to trainmen. The American Railway Association provides only four indications: stop; proceed; proceed with caution; proceed and approach the next signal prepared to stop. Nothing more than these is required in automatic block signal territory.

The report says that the committee was confronted by the demand for conveying a vast amount of information. There was no such demand, except among members of the committee; there is none outside. But there is a demand everywhere for simplicity. Some large terminals could be satisfactorily signaled with 50 per cent. fewer signals and lights than are now used. The committee has provided three kinds of stop indications; there is no reasonable necessity for this. One is enough. The important thing is to indicate stop; give the reasons afterward. Indications 4 and 5—No. 4 continue and No. 5 resume speed—are not included in the standard code. The majority of officers will say that they are unnecessary. Only technical reasons justify their inclusion here. A slow sign and a resume sign might conflict with a caution card held by the engineman.

Indication No. 7 should never be given. It is dangerous to guarantee the position of a signal in advance. Indication No. 8 is not necessary; the committee has shown no need for it, and there is no condition where it is required. Indication No. 9 is based on hair splitting considerations which are unworthy of attention. Indications 11 and 12 are objectionable for reasons already stated. There is no need of having both 13 and 14. Trainmen cannot be made to remember these 18 indications. Every one of them will be classed by those men as stop, caution or proceed.

Mr. Rudd.—Enginemen are not so ignorant as some people suppose. Those on our road have no trouble in reading all of the combinations that we have. The difficulties alleged in this connection are only a bugbear. Objection has been made to an indication to proceed after stopping; but is not this what is indicated by the use of the enclosed disk automatic block signal on the Chicago & North Western? As to the danger of guaranteeing a signal in advance, everybody, all over the country, does this in giving clear distant signals every day.

The only departure by the committee is in having the home signal at 45 deg. give advance information, and in the use of the medium speed arm. This last will be needed everywhere as soon as business becomes heavy. It is necessary on four-track lines where trains are constantly required to run through long crossovers with the least practicable loss of time. The arrangement of staggered lights and other features proposed by the committee have merits which are well-known. The indication "proceed and take siding at next station" is not so common, but it could be used to advantage on many roads where it is not used. It would diminish the use of caution cards.

The committee has not interfered with present methods. It endorses present practice as good; but in new installations the best ideas should prevail, and this is what the committee provides for. Who supposes that I would sign a report discrediting the practice of my own road? Who supposes such a thing about Mr. Peabody? The new can be used indiscriminately with the old and without confusion, and the only aim of the report and the only justification of the four years' work on the subject is to secure progress toward uniformity.

The signals fitted with staggered lights and with other features proposed in the report, which were installed on the Central division of the Philadelphia, Baltimore & Washington, have now been in use four years. This installation has the improvements proposed, except that it does not use the yellow light scheme. Out of 49 enginemen running on that division, 48 have expressed a preference for the upper instead of the lower quadrant. In the Philadelphia terminal the signals on the bridges have only two arms, the highest and the lowest, the second arm being omitted because of an arbitrary speed limit of ten miles an hour throughout the yard. The arms are three-position, and the lower arm is never shown vertical. Of 146 enginemen voting, 145 favor these signals. On the simple question as between the upper quadrant and the lower, 138 are in favor of the upper, five in favor of the lower and

three have no preference. As between three-position signals and the ordinary two-arm arrangement, 127 prefer the three-position and 16 the old style. On the Cumberland Valley road, where in a distance of 90 miles there are 171 signals, old style and new style mixed, a large majority of 60 enginemen voting prefer the upper quadrant. The officers of that road have never heard of any engineman being in doubt as to the indication of one of these signals. That road does not use green lights for clear nor does it give the permissive indication.

Mr. Denney (L. S. & M. S.).—That the proposed system does not discredit existing practice was affirmed by the association by vote at Milwaukee last year, volume 4, page 368. Let us reaffirm that position now.

Mr. Stevens.—So important a matter should be regarded as settled only in case the proposition can be carried by a large majority. The vital question is, shall we give specific information what to do at the indicating point and also what to do in advance, or shall we only tell the runner what to do at the indicating point? The minority believes that the last mentioned is the better.

Mr. Rudd.—The American Railway Association is the body to make requisites.

Mr. Clausen.—I have not charged that enginemen are illiterate or ignorant; I refer only to real limitations. Not even the college graduate can see dim green lights at a great distance. The committee has not shown sufficient reason for allowing enginemen to run fast past distant signals. A great railway president, now dead, was in favor of keeping all trains two blocks apart, and that view still has influential advocates.

Mr. Patenall (B. & O.)—Giving advance information is not encouraging enginemen to relax vigilance, as is claimed. Our tests have shown this. It is absurd to claim this, as has been claimed here to-day by gentlemen who themselves are giving advance information every day. It is only by this practice that our fast trains can be run. The scheme of the minority would necessarily reduce all speeds to 30 miles an hour. Let us not try to obstruct progress. Nothing that this association can do will prevent the best roads from using the best appliances; and, moreover, they will soon be putting in automatic stops. The minority objects to additional indications; this in the face of the fact that where additional indications have been adopted, written orders have been reduced 30 per cent. Superintendents are asking for more indications.

Mr. Stevens.—The Santa Fe is getting out a new book of rules and is reducing the number of definitions of indications. The views expressed here by the minority to-day are those of a large majority of operating men in the West.

Mr. Shaver (Rock Island).—This committee's work has been educational, but the time is not ripe for final action.

Mr. Patenall.—We have been "going slow" for five years; how long are we to keep this up? The committee, carrying out its instructions, has devised a uniform system—not necessarily a perfect system. Some roads have already acted in the direction of carrying out the committee's recommendations. We hope to see others follow.

Mr. Mann (Mo. Pac.).—The majority and minority are nearer together than they think. Give them more time.

Mr. Clausen.—This report should be kept in committee at least another year; there is some chance of agreement. This association should not endorse so important a proposition until after active and severe test.

Mr. Denney.—Mr. Stevens says he has changed his definitions of indications, but I am sure that his runners do just the same as before. If you cannot tell the engineman that the clear distant means a clear home, you are not playing fair with him.

Herbert S. Balliet.

Mr. Sperry (Gen. Ry. Sig. Co.).—Is Mr. Clausen correct in calling this scheme new? It is the result of years of study and experiment. Why postpone? There is no reason whatever.

Mr. Rudd.—The primary aspects have already been acted on (last year). In view of what has been said, I modify my motion so that it will read to approve the first, second and third recommendations of the report, and send them to letter ballot, and to accept the fourth and fifth as in the nature of a progress report. After some further discussion and the refusal of the meeting to continue the subject on the following day, Mr. Rudd's motion was carried by a vote of 43 to 26.

The election of officers for the ensuing year which, in accordance with the revised constitution, had been carried out by means of a letter ballot, following the action of a nominating committee, resulted as follows, each officer receiving a nearly unanimous vote: President, Herbert S. Balliet (N. Y. C. & H. R.), New York City; vice-president, Charles C. Anthony (Penn.), Philadelphia; secretary, C. C. Rosenberg, Bethlehem, Pa.; Eastern member of the executive committee, C. J. Kelloway (A. C. L.); Western member of the executive committee, B. H. Mann (Mo. Pac.). Atlantic City was selected as the place for the next annual meeting by 48 votes, as compared with 32 for Richmond, Va.

The meeting passed resolutions thanking Dr. A. G. Thomson, oculist of the American Railway Association, for experiments made and information given to aid the committee in its study of lunar white, and its suitableness as a night signal color. A resolution was also passed thanking Dr. William Churchill, of the Corning Glass Works, Corning, N. Y., for the elaborate studies in colors and glasses which he has made for the benefit of the Railway Signal Association.

W. H. Elliott (N. Y. Central) has been seriously ill for several months, and the meeting sent him a message of sympathy.

Herbert S. Balliet, the new president of the Association, is

engineer of maintenance of way of the Grand Central terminal, and signal engineer of the electric division of the New York Central & Hudson River. He was born in Neffsville, Pa., in 1868, and was for several years a telegraph operator for the Western Union and for the United Press. He was also station agent and operator on the Philadelphia & Reading. He began on the Lehigh Valley as operator, but he soon went into the signal department and was there from 1894 to 1905. He was appointed assistant signal engineer in 1901. Readers of this paper will recall a valuable series of articles by Mr. Balliet, published in these columns, on the care of automatic signals. He went to the New York Central from the Lehigh Valley in April, 1905. At that time he was secretary of the Railway Signal Association and for several years he has been a prominent worker on important committees.

EXHIBITS.

The display of signal appliances, while small, was good; but the location was unfortunate. The temporary wooden booths on the roof (tenth floor) of the hotel were exposed to the elements, which at times made the exhibitors uncomfortable and discouraged visitors.

The following is a complete list of the exhibitors:

Adams & Westlake Company, Chicago, Ill.—Switch and signal lamps; tower lamps; bridge lamps; long-time burners. Represented by G. L. Walters, A. S. Anderson, C. B. Carson, William J. Piersen, H. G. Turney and F. N. Grigg.

American Vulcanized Fibre Company, Wilmington, Del.—Samples of vulcanized fiber. Represented by John Barron.

W. F. Bossert Manufacturing Company, Utica, N. Y.—Insulated rail joints; the "fool-proof" switchstand, with preliminary locking of signal; switch point adjusters; semaphore blade clasps. Represented by W. F. Bossert and F. W. Guillaume.

Bryant Zinc Company, Chicago, Ill.—Interlocking relays; No. 666 crossing bells; Waterbury primary battery; lightning arresters; fiber conduit; pocket meters. Represented by A. F. Klink, R. N. Baker, E. M. Deems and Stanley Bryant.

Buda Foundry & Manufacturing Company, Chicago, Ill.—One No. 11, 2¼-h.p. gasolene motor car; one No. 10, 2¼-h.p. gasolene motor car; one railway special tool grinder; new helical cut gears for handcars. Represented by J. R. Artmair, George B. Shaw, F. S. Starratt, T. H. Wheeler and R. Smith.

Dressel Railway Lamp Works, New York.—Belgian post lamps; crossing gate lamps; Washington Terminal semaphore lamps; Pennsylvania Railroad switch lamps; standard Railway Association semaphore lamps; New York Central Lines switch and semaphore lamps; long-time burners; standard Dressel burners; drawn steel oil pots, etc. Represented by Frank W. Edmunds and Edward W. Hodgkins.

Duplex Metals Company, New York.—Copper-clad telephone and signal wire. Represented by J. E. Ham and W. T. Kyle.

Edison Manufacturing Company, Orange, N. J.—Edison and BSCO primary batteries. Represented by E. E. Hudson, F. J. Lepreau and E. W. Brown.

Electric Storage Battery Company, Philadelphia, Pa.—Various types of storage batteries used in signal work: 7-S "Exide" type, of which 40,000 are in use for automatic block signal work on the Harriman Lines; Missouri Pacific type of portable "Exide" batteries, consisting of five cells 7-SS installed in one box. Among the "Chloride Accumulator" types were cells of D-5, complete in glass jars, E-7 and their various couple types, BT, CT, ET and PT. Represented by Godfrey H. Atkin, H. M. Beck, R. I. Baird and Charles W. Terry.

Fairbanks, Morse & Company, Chicago, Ill.—No. 0 gasolene velocipede motor car; No. 2 T gasolene motor car; 4-h.p. vertical special electric gasolene engine, direct connected to D. C. generator. Represented by R. A. Paterson, R. E. Derby, C. D. Walworth and C. T. Fugit.

Frank M. Foster, Columbus, Ohio.—Foster interlocking switch stand. Represented by Frank M. Foster.

Galena-Signal Oil Company, Franklin, Pa.—Samples of railway safety oil for headlights and switch lamps; and railway signal oil for hand lamps, etc. Represented by J. W. Bunn.

General Electric Company, Schenectady, N. Y.—Direct-current top-post three-position signal; alternating-current top-post three-position signal; different styles of relays; switch box, volts-ammeter (portable) for signal work; samples of resistance tubes, signal lamps, Tungsten and carbon lamps; compensators for A. C. signal lamps; samples of wire and cable. Represented by Frank Rhea and L. A. Hawkins.

General Railway Signal Company, Rochester, N. Y.—Model 2 A universal signal, equipped with universal upper-quadrant spectacle; full line of direct-current relays, switch and lower indicators. Represented by George D. Morgan, H. M. Sperry, W. K. Howe, Frank R. Moffett, F. H. Jones, George MacDonough, M. R. Briney and Morris Wuerpel.

Peter Gray & Sons, Boston, Mass.—Switch and signal lanterns, with long-time burners, without chimneys. Represented by George M. Gray and Mason H. Gray.

Groff Drill & Machine Tool Company, Camden, N. J.—Samples of the Groff track drill. Represented by J. B. Webb, of the Simmons Hardware Company, St. Louis.

Hall Signal Co., New York.—Two new Style H, upper-quadrant, top-post signals; one new Style G, switch box. Represented by W. J. Gillingham, Jr., W. H. Lane and W. G. Hovey.

Handlan-Buck Manufacturing Company, St. Louis, Mo.—Switch lamps; semaphore lamps; train lamps; train order lamps of latest patterns; several patterns long-time burners, with and without chimneys; seamless steel founts; a new line of malleable iron pins and appliances for supporting telephone, telegraph and electric lighting lines; guy anchors; guy clamps; way brackets. Represented by A. H. Handlan, Jr., and H. O. Rockwell.

Hayes Track Appliance Company, Geneva, N. Y.—Hayes derails, models A and C. Represented by S. W. Hayes, W. Harding Davis and E. R. Kapp.

Kerite Insulated Wire and Cable Company, New York, N. Y.—Kerite insulated wires and cables; samples of fifty-mile cable made for Panama Canal. Represented by Azel Ames, P. W. Miller, J. A. Renton, J. V. Watson and E. B. Price.

T. E. Lutz & Brother, Galion, Ohio.—Lost motion take-up and rod regulator; Lutz rod adjuster; Lutz crank attachment. Represented by E. R. Lutz.

Lutz-Lockwood Manufacturing Company, Roselle, N. J.—Lutz primary cells (plate type); S-X ignition dry cells; Gordon primary cells. Represented by W. M. Kinch, R. M. Barwise and G. Marloff.

National Carbon Company, Cleveland, Ohio.—Samples of Columbia track batteries. Represented by E. L. Marshall and W. H. Moffett.

Rail Joint Company, New York.—Weber and continuous insulated joints; fibers. Represented by V. C. Armstrong, W. E. Clark, E. A. Condit, Jr., H. C. Hollowway and R. W. Smith.

Railway Specialty & Supply Company, Chicago, Ill.—Bond wire protectors; the arc lamp lightning arrester; P. & M. rail anchor; channel pins. Represented by F. A. Preston.

Railroad Supply Company, Chicago, Ill.—Motor-driven automatic block signal; highway crossing bells; relays; lightning arresters; R. R. S. derailer. Represented by H. M. Buck and E. W. Vogel.

School of Railway Signaling, Utica, N. Y.—Pamphlets describing its method of instruction in railway signaling. Represented by H. C. Williams and F. C. Lavarack.

Union Switch and Signal Company, Swissvale, Pa.—Style S three-position electric motor semaphore; 9-C relays; automatic electric time release; S. C. signal motor, 55 volts, 25 cycles; one pair of staff instruments fitted for use with or without operators; universal deflection stands; Keystone insulated joints. Represented by Sidney Johnson, George Blackmore, W. E. Foster, W. M. Vandersluis, M. D. Hanlon, W. H. Cadwallader, T. H. Patenall, H. McCready, H. S. Beakes and J. G. Schreuder.

Watson Insulated Wire Company, Chicago, Ill.—Kerite insulated wires and cables. Represented by J. V. Watson and E. B. Price.

Westinghouse Storage Battery Company, Boonton, N. J.—Storage batteries for all departments of railway service. Represented by Edgar Lewis.

C. H. Wahll & Company, Boston, Mass.—Special railway fiber; fusees. Represented by F. R. Whall.

World Signal Company, Phillipsburg, Pa.—Signals. Represented by J. H. Wisner, Jr.

Yale & Towne Manufacturing Company, New York, N. Y.—Signal locks and locks for general use. Represented by C. H. Van Winkle.

TRAFFIC STUDIES.

BY RAY MORRIS,
Managing Editor, *Railroad Age Gazette.*

II.

SEABOARD AIR LINE.

The development of the Seaboard Air Line is characteristic of the history of the new South. Through trains to the states on the southern Atlantic coast have been run only for about 25 years; prior to that there was a diversity in gages which made it necessary either to reload freight cars and transfer passengers or to lift the car body from one set of trucks on to the other. The physical condition of the lines in the South in the eighties was extremely bad; the country was not prosperous and, until about 1884, the fast coastwise steamers running between New York and Charleston, Savannah and other ports, carried not only the bulk of the freight, but passengers, mail and express matter as well.

After the railway gages were unified and through rail routes were established between the North and the South, a gradual rehabilitation of the lines was undertaken. Both physically and commercially, railways in the South have suffered from the fact that they could be built too easily. On the sandy loam which characterizes much of the Carolinas, Georgia and Florida, it was possible to build a railway for less than $10,000 a mile, and the temptation to the promoter was great. Consequently, through a considerable part of the South there has for years been an oversupply of inferior lines.

In recent times three great companies have undertaken to make efficient systems out of the collections of crude short lines with which they started business. At present the three companies divide the territory in a more or less orderly manner, the general arrangement being that the Southern Railway occupies the highlands and the western part of the coast plain; the Seaboard occupies the center of it, and the Atlantic Coast Line the easternmost part, but all three companies compete at almost all the principal cities, either directly or through affiliated companies, and in addition there is still a

very large unabsorbed mileage of short lines. In Georgia alone, with 6,829 miles of railway, there are 62 operating companies.

The Seaboard Air Line dates its corporate existence from 1900, when it was organized as successor to the Richmond, Petersburg & Carolina Railroad, which owned a line from Norlina, N. C., 102 miles long. Prior to that time, however, the foundation of the present system existed in what was known as the Seaboard Air Line Passenger Route, a grouping for traffic purposes of the Seaboard & Roanoke, Raleigh & Gaston, Raleigh & Augusta and Carolina Central roads. This route began at Portsmouth, Va., receiving passengers and freight from Baltimore by the Bay Line of steamers, and extended to Hamlet, N. C., where connections were made for Charlotte, Wilmington, Atlanta, Birmingham, Montgomery and New Orleans. This route was gradually consolidated into a company known as the Seaboard Air Line, operating its own road from Portsmouth, Va., and Weldon, N. C., to Wilmington and Atlanta, while traffic for New Orleans was routed over the Western of Alabama and the Louisville & Nashville from Atlanta. This arrangement held for a good many years, but the Seaboard Air Line and the Atlantic Coast Line did substantially the same business between substantially the same points, and were always in sharp competition. Consequently, when the Louisville & Nashville passed under Coast Line control the Seaboard was seriously damaged in its western outlook.

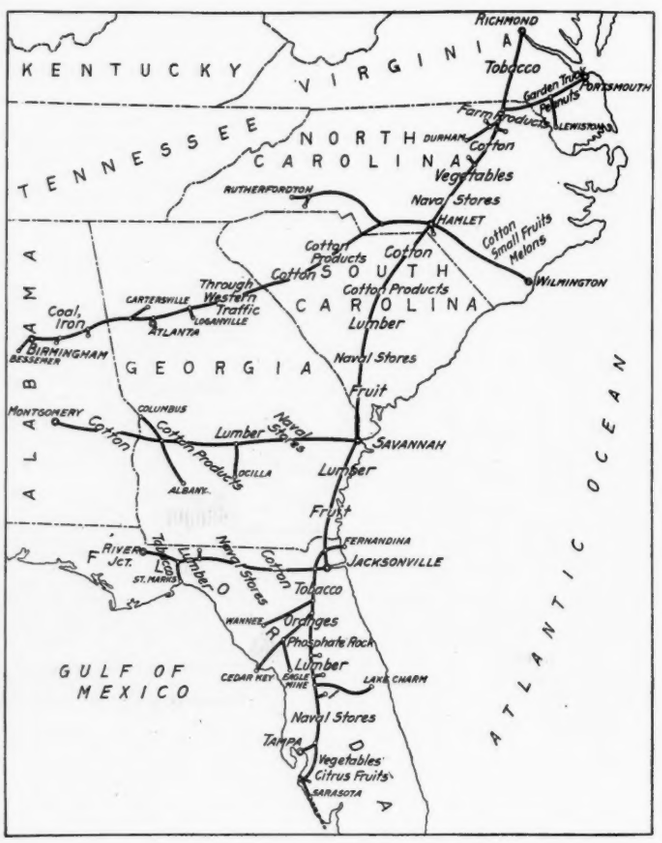
In spite of this drawback, however, the earnings of the company have increased very rapidly in the last few years. A relatively high funded debt; the necessity of the extension of bonds at a time when new funds were substantially impossible to raise; and a rather high operating expense account due to the general conditions on which the property was built up, were primarily the cause of the appointment of receivers in January, 1908.

As at present constituted, the Seaboard Air Line is a part owner in the joint route from Washington to Richmond. Its main lines then extend from Richmond and Portsmouth to Wilmington and Rutherfordton, N. C., Birmingham and Montgomery, Ala., Savannah, Ga., and Fernandina, Jacksonville, River Junction, Cedar Keys, Tampa and other Florida points. Its traffic country is not yet as good as that of the Atlantic Coast Line, operating in substantially the same territory, but it closely approaches it, and through its connections at Birmingham is now in an independent position with regard to southwestern connections; while the recently completed Carolina, Clinchfield & Ohio, which crosses the mountains from Johnson City, Tenn., to Bostic, on the Seaboard, gives the company promise of sharing in a considerable drift of traffic heretofore enjoyed almost exclusively by the Southern Railway.

At the time the company's last annual report was published for the year ending June 30, 1907, manufactures and miscellaneous articles made up 34.99 per cent. of the traffic of the road; forest products, 34.15 per cent.; products of agriculture, 15.76 per cent.; products of mines, 13.93 per cent., and animal products, 1.17 per cent. Charles F. Speare has well said that the function of the Seaboard in general is to collect the raw products of the South, and its fruits and vegetables, and carry them to centers of manufacture and to northern produce markets; then to assemble in the North that general merchandise which is there produced and distribute it among the seaboard states of the South, as well as ship it even west of the Mississippi.

The Seaboard has seven operating divisions. The first division extends from Richmond to Raleigh, including branches; the second division from Raleigh to Columbia and from Monroe, N. C., to Wilmington; the third division extends from Monroe to Atlanta and to Rutherfordton, N. C.; the fourth division extends from Columbia to Jacksonville and west to River Junction; also from Baldwin to Fernandina, and it includes the St. Marks & Tallahassee southeastern branches. The fifth division extends from Savannah west to Montgomery with several branches, and includes the large and important terminals at Savannah. The sixth division extends from Jacksonville to Tampa, and includes all branches south of Jacksonville. The seventh division extends from Atlanta to Birmingham, including also the branches on the road.

The accompanying map shows fairly well the location of the traffic on the road, although it is impossible to differentiate the districts very clearly. Cotton and cotton products, lumber and naval stores, are found throughout almost the entire system. Tobacco originates in the extreme north in the territory served in Virginia and in the extreme south in Florida. Coal and iron are obtained from the Birmingham district. Although the westward movement of these commodities is still extremely light, a good part of the traffic from Birmingham finds an outlet through the Cincinnati and Memphis gateways instead of moving northeast or east to the seaboard ports. There are strong reasons to expect, however, that the next



Traffic Map; Seaboard Air Line.

epoch in the growth of the Birmingham district, which has not yet arrived at first importance, will be an extension of the eastward and northeastward movement of tonnage. The Seaboard can naturally expect to share largely in any such movement.

The busiest line on the system is that from Jacksonville to Richmond, since on this long stretch of single track is marshaled all the Florida business, while north of Savannah it carries the greater part of the Georgia business as well, and the single-track neck from Hamlet, N. C., to Norlina, leading to Portsmouth and Richmond, must needs convey a very material part of all-rail traffic collected from and destined for the entire Seaboard system. The busiest of the three important western branches is that from Birmingham and Atlanta to Hamlet. There is no traffic in naval stores on this line, but such coal and iron as the Seaboard received from the Birmingham district comes over it.

The line to Portsmouth carries considerable standard mer-

chandise which comes in for Atlanta and other points. Comparatively little coal is moved over this line, however. The Central of Georgia and the Louisville & Nashville are the most important coal feeders to commercial territory in the Atlantic coast states, but a large amount of coal also reaches the principal southern ports in barges from the Norfolk district. The Seaboard owns the Baltimore Steam Packet Line of steamers operating between Baltimore and Norfolk, and also has an interest in the Old Dominion Line, running between Norfolk and New York.

As is the case of all roads operating in this territory, the cotton traffic is important, not only for itself, but for its by-products—cottonseed products and the fertilizer which has to be shipped in. Roughly, it is calculated that a ton of freight moves for every bale of cotton. The cotton weighs 500 lbs., the fertilizer weighs the same, and the seed and by-products weigh a thousand pounds.

Much of the cotton and naval stores moving over the system are exported from Savannah, Wilmington and other points, so that the rail movement on them is only partial. The average haul of cotton is perhaps 200 miles over the Seaboard, and the competitive situation is such that the company gets perhaps $80 on the average for a full load of cotton moving this distance, although cotton moves under a wide range of rates, according to its destination.

The average haul of fertilizer is perhaps 150 miles. This traffic moves both ways, however. There is a large export movement of phosphate rock from Florida, and perhaps 75 per cent. of the output of the Florida mines crosses the ocean. Foreign mixed fertilizers are imported at Jacksonville, Savannah and Wilmington. The Seaboard has provided modern elevators at Fernandina, Fla., to handle the export business there, and the elevater just completed by the company, at Tampa, is one of the best equipped in the South, and is capable of handling 3,000 tons of phosphate in a ten-hour day.

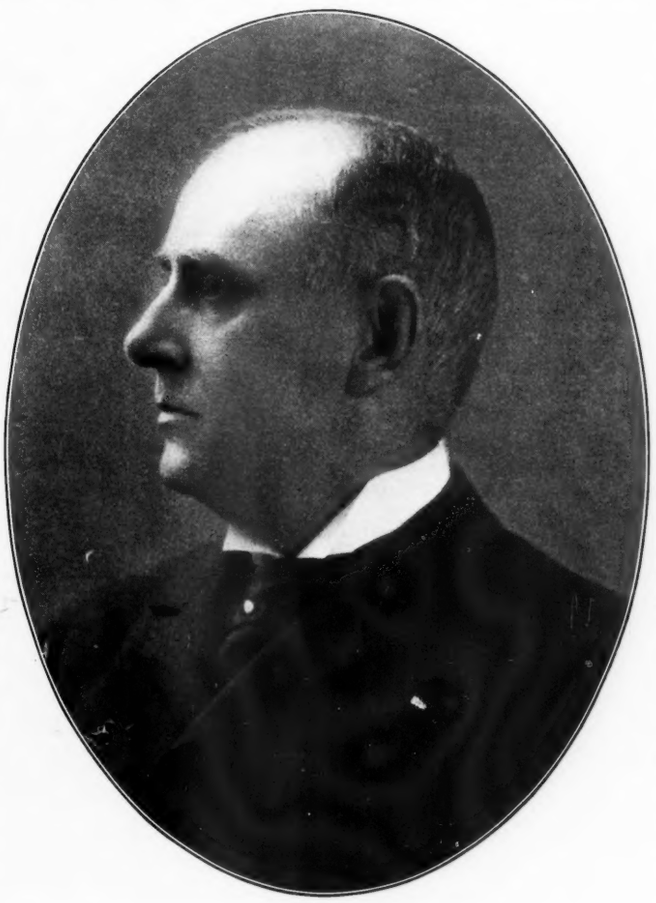
There is comparatively little movement of export lumber, although the coastwise movement in steamers and sailing vessels from Tampa, Jacksonville, Fernandina, Savannah, Wilmington and Norfolk is heavy. The company gets an excellent all-rail movement of dressed lumber, however.

Savannah is the largest cotton market on the southeastern coast, ranking next in order to Liverpool, Galveston and New Orleans as a world market. It attracts a good part of the cotton produced on the Seaboard system, although some goes to Carolina mill points. The Seaboard has handled 340,000 bales of cotton in one season at its Savannah docks, although the largest cotton export and coastwise shipment is done from the Central of Georgia docks, which have handled as high as 900,000 bales in one season.

A general comparison of the business done by other roads in the same territory indicates that the Seaboard is more similar to the Atlantic Coast Line than to any other road, although the Coast Line has better towns and gets more phosphate rock in Florida and more vegetable traffic in Carolina. The Southern Railway does what is more characteristically a through business and carries more manufactured articles. The Georgia Central has a better cotton business and a fine peach business, but carries no oranges and not as much phosphate rock as the Seaboard.

EDWIN HAWLEY.

The election of Edwin Hawley as chairman of the board of directors of the Missouri, Kansas & Texas marks the extension of Mr. Hawley's control over the Missouri, Kansas & Texas. It was only comparatively few months ago that he gained control of the Chesapeake & Ohio, and he had previously been in control of the Iowa Central, of which he is president, the Toledo, St. Louis & Western and the Chicago & Alton. As a railway man his work has been largely confined to the traffic department until, of course, he entered the executive department. He was a friend of Collis P. Huntington, and acted as assistant general traffic manager of the Southern Pacific long after he himself was in control of other roads. He was a banker, however, as well as a traffic man, and as such has shown very keen judgment in the selection of properties in which to invest. One of the most striking examples of this was the case of the Colorado & Southern, which, when he gained control, was in the hands of a receiver and was apparently in pretty bad condition. He developed the property, realizing even in the early days the great possibility of a road running from Colorado to the Gulf of Mexico; gave the C. & S. such a line by acquiring the Fort Worth & Denver City and other roads, and brought the property up to such a standard that the Burlington was willing to pay a good price for control of it.



Edwin Hawley.

Mr. Hawley is quoted in an interview published in the *Saturday Evening Post* as saying: "I have played a lone hand and stuck to my job. I have simply done two things—I have worked and I have waited." Both of these things he has done very quietly, so quietly, in fact, that it is difficult to realize how large the Hawley system has become.

Edwin Hawley was born in 1850 at Chatham, N. Y., and began railway work when he was 17 as a clerk on the Erie. He worked in various clerical positions, and later served on the Chicago, Rock Island & Pacific up to 1874. He was at that time appointed contracting agent of the California Fast Freight Line, and a year later was made general eastern agent. By 1883 he had become general eastern agent of the Galveston, Harrisburg & San Antonio and of the Southern Pacific, and a year or two later was made general eastern agent also of the Morgan's Louisiana & Texas Railroad & Steamship Co. and other subsidiary companies of the Southern

Pacific. In 1890, when these properties were consolidated, Edwin Hawley was made assistant general traffic manager of the Southern Pacific Co., with office at New York, holding this position until 1902. In the meantime, in 1894, after the reorganization of the Minneapolis & St. Louis, Mr. Hawley was made vice-president and two years later was elected president. In 1900 he was elected president of the Iowa Central and got control of the Toledo, St. Louis & Western. When the Rock Island-Frisco interests and the Union Pacific found it no longer expedient to alternately control the Chicago & Alton, this property was taken over by the Toledo, St. Louis & Western and added to the Hawley system.

COST OF RECENT CONSTRUCTION ON THE HARRIMAN LINES.

As a part of his testimony before the Interstate Commerce Commission in the Salt Lake rate case, J. Kruttschnitt, director of maintenance and operation of the Harriman Lines, introduced the accompanying table showing the cost per mile of recent construction on the Union Pacific and affiliated roads. He used these figures as a basis for estimating the cost of reproducing the Union Pacific. He stated that there were some branches of this road that are not in as good condition and would not cost as much to reproduce as the branch lines for which figures are given in the table. Making due allowance for these less valuable branches, he estimated that the cost of reproducing the entire Union Pacific in its present condition would be between $75,000 and $80,000 per mile.

Cost per Mile of Recent Construction on Union Pacific and Affiliated Lines Used as Basis for Cost of Reproducing Union Pacific System.

		Built.	Length.	Cost General const'n road-bed & track.	Items required on main line but not on 2d trk (a). Signals.	Add'tnal main tracks & sidings.	General shops & mach'nry.	Large terminal facilities.	Rolling stock.	Contingencies and general organization, 5%.	Interest (10%) during construct'n.	Adaptation and solidification.	Total, per mile.
	Main Line.												
1.	Denver North—Denver-St. Vrains Branch	1909.	20.07	$57,110	$1,500	$5,280	$800	$10,000	$10,630	$4,266	$8,959	$2,000	$100,545
2.	" " Hillsboro-Ft. Collins	1909.	25.0	56,166	1,500	.....	800	17,400	10,630	4,589	9,637	2,000	108,002
3.	" " St. Vrains Br.-La Salle	1909.	28.25	55,100	1,500	5,280	800	10,000	10,630	4,165	8,748	2,000	98,223
4.	Union Pacific—General reconstruction	1900-3.	183.37	48,300	1,500	5,280	800	10,000	10,630	3,625	8,034	2,000	90,369
5.	" " 2d tr'k—Seminole-Rawlins	1909.	2.65	38,822	b	9,780	800	10,000	90,630	3,777	7,630	2,000	88,939
6.	" " do.—Green River-Granger	1909.	29.15	44,200	b	$5,500 9,780	800	10,000	10,630	4,045	8,495	2,000	95,450
7.	" " do.—Hanna-Rawlins	1909.	38.24	59,400	1,500	5,500 9,780	800	10,000	10,630	4,881	10,249	2,000	114,740
8.	" " do.—Pullman-Sand Creek	1909.	2.92	38,941	1,500	5,500 9,780	800	10,000	10,630	3,863	8,111	2,000	91,140
9.	" " do.—Watson's Ranch-North Platte	1909.	87.57	46,800	b	5,500 9,780	800	10,000	10,630	4,175	8,768	2,000	98,453
10.	S. P. Co.—Reconstruction—Ogden-Reno	1902-4.	323.58	87,400	b	 5,280	800	10,000	10,630	5,705	10,931	2,000	132,246
11.	O. R. & N. — Reconstruction — Troutdale-Bonneville	1909.	12.18	76,872	1,500	 5,280	800	10,000	10,630	5,254	11,034	2,000	123,370
12.	O. & W. R.R.—Portland-Seattle, excluding Columbia River Bridge	1909.	181.7	95,500	1,500	 5,280	800	98,000	10,630	10,585	22,230	2,000	246,525
13.	S. P. Co.—Beaverton-Willsburg	1909.	10.55	76,800	1,500	 5,280	800	10,000	10,630	5,250	11,026	2,000	123,286
14.	Average for above excl. excessive cost of terminals for O. & W.	.....	945.23	.....	.....	.....	.....	.....	.....	.....	.....	.....	$118,324
15.	U. P. R.R.—New line: Omaha to Lane	1909.	11.61	330,038	b	....	800	10,000	10,630	17,573	36,904	.....	407,945
16.	S. P. Co.—Bay Shore Ry.	1908.	9.84	939,800	b	 4,500	800	10,000	10,630	48,286	101,402	2,000	1,117,418
17.	" " New line—Rocklin-Colfax	1909.	31.02	160,500	b	 5,280	800	10,000	10,630	9,360	19,657	2,000	218,227
18.	" " Niles to Redwood	1909.	16.32	138,500	b	 5,280	800	10,000	10,630	8,260	17,347	2,000	192,817
19.	Total all above lines	.....	1,014.02	.....	.....	.....	.....	.....	.....	.....	.....	.....	$151,357
	Branches.												
1.	U. P. (Topeka Branch)—Onagan-Carden	1909.	32.44	50,700	.....	.....	800	8,000	10,630	3,506	7,364	1,500	$82,500
2.	" —Greeley Branch	1909.	26.33	47,000	.....	.....	800	8,000	10,630	3,321	6,975	1,500	78,226
3.	" —Pleasant Valley Branch	1909.	17.15	48,700	.....	.....	800	8,000	10,630	3,406	7,154	1,500	80,190
4.	" Kilpacker Creek Branch	1909.	21.7	27,061	.....	.....	800	8,000	10,630	2,325	4,882	1,500	55,198
5.	O. S. L.—Huntington-Iron Dyke	1909.	58.0	43,300	.....	.....	800	8,000	10,630	3,136	6,587	1,500	73,953
6.	O. R. & N.—Lake Creek & Cœur d'Alene	1909.	12.36	38,800	.....	.....	800	8,000	10,630	2,911	6,114	1,500	68,755
7.	O. R. & N.—Des Chutes Branch R.R.	1909.	130.0	46,293	.....	.....	800	8,000	10,630	3,286	6,901	1,500	77,410
8.	Ilwaco R. R.—Megler-Ilwaco Junction	1909.	13.4	52,600	.....	.....	800	8,000	10,630	3,601	7,563	1,500	84,694
9.	O. & W.—Grays Harbor & Puget Sound R.R.	1909.	58.1	46,200	.....	.....	800	8,000	10,630	3,281	6,891	1,500	77,302
10.	S. P. Co.—Grass Lake to Klamath Falls	1909.	88.73	37,700	.....	.....	800	8,000	10,630	2,856	5,999	1,500	67,485
11.	S. P. Co.—Sacramento-Walnut Grove	1909.	24.22	73,400	.....	.....	800	8,000	10,630	4,641	9,747	1,500	108,718
12.	Average of above		480.43										$75,780

(a) Includes fences, stock yards, water and coal stations, station and miscellaneous buildings, right of way and real estate, telegraph lines, engine houses and turntables. (b) Included in Column 4.

LOUNGING CARS ON THE BURLINGTON.

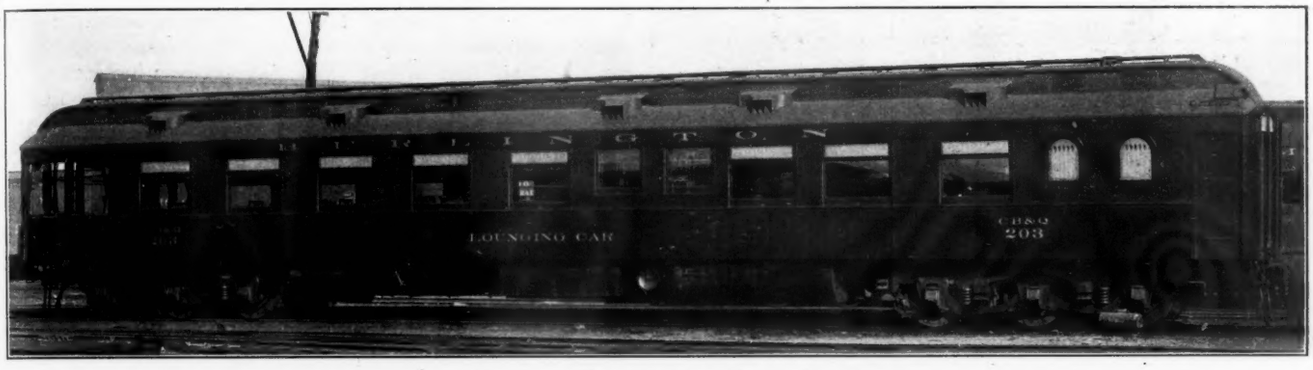
The Burlington has adopted a novel type of club car, known as a lounging car, which were built by the Pullman Company, and have been installed on the Chicago-Denver Lim-

Observation Platform.

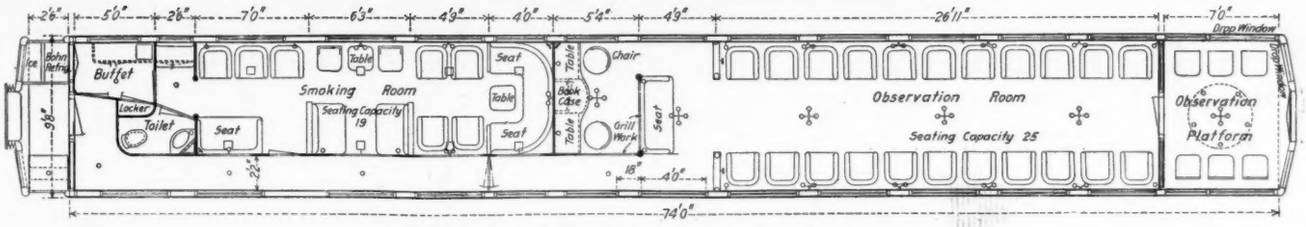
ited No. 1. They are set apart exclusively as a lounging place for passengers in the sleeping cars on this train.

Each car is divided into four separate rooms, the club room in the front being completely shut off from the rest of the car by an aisle running alongside. This room is supplied with circular and straight divans, with movable armchairs, all upholstered in dark Spanish leather, and with tables, fixed and movable. There is a buffet attached, with an attendant in charge. The apartment is finished in dark golden oak with art glass panels above the windows and art glass lights. The deck, the same as the rest of the car, is finished in ivory shade.

Back of the club room is a writing room entirely enclosed by a mahogany grill, containing two writing desks, President Elliot's 5-ft. shelf of books, the current magazines, and a telephone, which is connected while the train remains at terminals. Back of this is the main lounging room for ladies and gentlemen, no smoking being permitted in this room. It is finished in light-colored Cuban mahogany, in distinct contrast to the clubroom, and has armchairs seating 22 persons. Back of this main lounging room is the novel feature of the car—a sun-parlor in winter and a veranda in summer. It is finished to conform to the main lounging room, but is entirely enclosed in glass, quickly removable if weather permits. This room seats ten to twelve persons and is entirely protected from the weather. It is as free from dust and cinders as the main portion of the car, and therefore has the advantages of the ordinary observation



New Lounging Car for the Burlington.



Floor Plan of Lounging Cars for the Burlington.

Observation Room.

Smoking Room.

(a) Includes fences, stock yards, water and coal stations, station and miscellaneous [illegible]

platform without the discomforts. There are no steps at this end of the car whatever, and, therefore, nothing to mar the comfort of the passenger.

These cars, which were put on last month, have proven to be one of the most popular features adopted. During one of the trips the 55 sleeping-car passengers in the train mailed

Telephone and Writing Room.

an unsolicited testimonial to the passenger traffic manager of the road commending the company for the installation of the cars.

THE ADJUSTED TONNAGE FORMULA FOR DETERMINING TRAIN LOADS.

BY ALEXANDER P. GEST,
Superintendent, Belvidere Division, United Railroads of New Jersey.

The investigation of the subject of train resistances has held a prominent place in the minds of operating officers for the past decade, and it is to be hoped that we may some day arrive at its solution, but there are so many elements involved that the complete analytical formula would be too complicated for practical use in determining proper train loads. What is wanted for every day use in making up trains is a simple formula, convenient in its application, and sufficiently reliable in its results, bearing in mind that the variations between different cars are such as to prevent absolute accuracy in the application of any general rule.

Several methods have been devised with these objects in view, but that commonly known as the "Adjusted tonnage" method, seems to combine substantial accuracy and readiness of application in a higher degree than any of the others.

The objection most commonly urged against "Adjusted tonnage" is that it is at best rough and unscientific approximation; but, as stated above, different cars vary so much in their tractive resistance under the same load that an approximation is all that can be looked for, and the purpose of these remarks is to show that although but an approximation, it is based upon correct mathematical considerations; and it has besides the advantage that it can be worked up for any particular ruling grade or controlling point by a series of simple observations on trains in regular service and under ordinary working conditions.

If the tractive resistance of a car were in all cases proportional to the weight of the car, we should have the formula

$$r = f\,w$$

in which r = the resistance of a single car,
w = the weight of car and lading
and f = the "coefficient" of friction.

It is well known, however, that the resistance is not strictly proportional to the weight, the ratio decreasing as the weight increases; or, in other words, $\frac{r}{w}$ is not constant.

If, however, we consider the total resistance as made up of two parts, one of them proportional to the weight, and the other containing all the elements of resistance which are not so proportional, we will have a formula of the form,

$$r = f\,w + q,$$

in which q may or may not be independent of w.

Now if the components of q, which are functions of w, are small compared with those which are independent of w, or if the variations of q with respect to w are small compared with f w, they may be omitted without seriously affecting the value of r; and the correctness of this assumption seems to be borne out in practice; that is, the errors resulting from the assumption that q is constant with respect to w are smaller than that actual variations between successive observations, and are probably less than the differences between different cars having the same total load.

Now $r = f\,w + q$ (q = constant) is the equation of a straight line, and the effect of our assumption is to neglect the slight differences between the ordinates of a straight line and the corresponding ordinates of the true resistance curve.

It is obvious, of course, that the assumption would lead to serious errors if adopted for the entire extent of the resistance curve, but within the limits of railway practice the errors are comparatively small and decrease as the weight increases.

Now taking the equation

$$r = f\,w + q$$

as representing the resistance of one car, and denoting by r_1, r_2, etc., the resistances of each successive car in a train, and the weights by w_1, w_2, etc., we have for the first car,

$$r_1 = f\,w_1 + q,$$

and for the second car

$$r_2 = f\,w_2 + q,$$

and for the nth car

$$r_n = f\,w_n + q,$$

adding and putting R for the sum of all the rs equal to the total resistance of the train, and W for the sum of all the

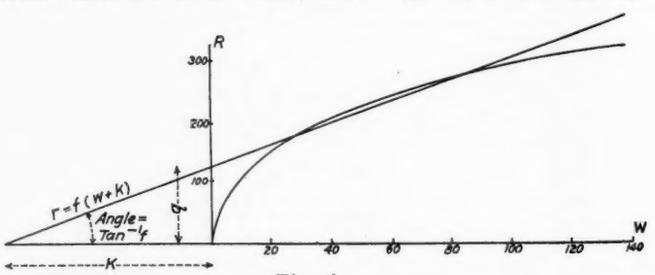


Fig. 1.

ws, equal to the total weight of the train, we have for a train of n cars

$$R = f\,W + n\,q,$$

and similarly for a train of n_1 cars

$$R_1 = f\,W_1 + n_1\,q,$$

and for two trains of equal resistance we have

$$f\,W + n\,q = f\,W_1 + n_1\,q,$$

whence

$$\frac{q}{f} = \frac{W_1 - W}{n - n_1}$$

writing k for $\frac{q}{f}$, we have the resistance of a train

$$R = f\,(W + n\,k)$$

or

$$\frac{R}{f} = W + n\,k$$

in which $\frac{R}{f}$ is the "adjusted tonnage" rating of the engine, and is equal to the total weight of the train plus n times k; and the rule for adjusted tonnage loading is immediately

derived, "Add the 'adjustment' k to the weight of each car, and give to each engine a total equal to $\frac{R}{f}$."

The following diagram will show the relations between this true resistance curve, the assumed approximation to it by a straight line and the mathematical significance of f and k.

In practice the data are determined by coupling the dynamometer car next to the engine on freight trains in regular service; the total train resistance, or tractive power developed, is taken from the dynamometer record and the total weight from the card waybills; then dividing R and W by the number of cars behind the dynamometer we get r and W, the average resistance and weight of one car.

These are plotted directly on the diagram, and after a sufficient number of tests have been made a straight line is projected so as to strike a fair average, or rather to lie a little above the points as plotted; then noting the points where this line intersects the axis of r and w, the values of f and k are obtained directly from the diagram.

In taking the observations, the trains should be moved over the ruling grades or the controlling points of the division at as nearly uniform speed as possible, so as to eliminate the corrections for acceleration or retardation, and the speed should be that ordinarily made by similar trains; in other words, the observations should be made under ordinary working conditions, and the fact that the formula thus derived is based on performance is no slight consideration in its favor.

REPORT ON SIGNALING PRACTICE.*

II.

Indication No. 9, proceed—prepare to stop short of any obstruction in the block, is believed to be a better wording, following closely that of the Caution Card in the Standard Code, for the "permissive block" indication numbered 19 in the report of 1908, and there placed under the heading, "Secondary System." It is felt that, as this is an indication directly governing the movement of trains, it should be included among the primary indications. The committee believes that it will be supported by many railway officers in the view that this indication is so different from No. 7, or still more from No. 10, in the character of the instructions given to the engineman and the handling of the train required, that different indications and aspects are needed for consistent signaling.

Indication No. 10, Proceed at limited speed. It is hardly necessary to elaborate on the lack of uniformity that has prevailed in the significations of the different arms of interlocking home signals. After an exhaustive study of the subject the committee became convinced that, in a consistent and universally applicable system of signaling, the safe speed at which the turnouts or crossovers set up in a given case could be taken should be indicated in a uniform manner by the signals; and that it is wholly impracticable to provide for the intelligible indication of individual routes in all situations by semaphore signals. * * *

The committee concluded that three gradations of speed could successfully be indicated by semaphore arms. Indication No. 6, Proceed, permits unlimited speed, so far as the signal indication is concerned, subject, of course, to such general limitation as may be in force at a particular point. For the next, or intermediate, rate the committee proposes the phrase "limited speed," and for the third "low speed."

It is obvious that the idea of "speed signaling" may be expanded to include the indication by signal of reduced speed made necessary by conditions other than movement over turnouts or crossovers, but it is also clear that the latter condition will always be a prominent occasion for such indications. Under indication No. 10, as relating to passage over turnouts or crossovers, safe movement will evidently be secured if the train maintains but does not exceed the specified speed when passing the signal and until it is beyond the switches. In practice the distance to be traveled at limited speed might be defined by a signal in advance, the Proceed indication of which would cancel the limited-speed indication of the first signal; or might be prescribed by rule, the distance fixed being sufficient to cover any series of turnouts or crossovers to be met with. In any case, however, with due regard for both safe and expeditious train movement, it must be conceded that the indication, Proceed at limited speed, without added qualification, will be fully carried out if the train keeps up to the specified rate of speed to the next signal.

Indications No. 11, Proceed at limited speed—prepare to stop at next signal, and No. 12, Proceed at limited speed—prepare to stop short of any obstruction in the block, are qualifications of No. 10, formed in exactly the same way as Nos. 7 and 9 are formed from No. 6, and seem to need no further explanation than that given in connection with those indications.

Indications No. 13, Proceed at low speed, and No. 14, Proceed at low speed—prepare to stop, are recommended with a view to expediting train movements. No. 13, like No. 10, imposes no restriction other than maintenance of the specified speed for a distance prescribed by rule or defined by a signal in advance which must then give some Proceed indication. If it indicated Stop, indication No. 14 would be given at the first signal. Indication No. 14 imposes the greatest restriction, not only low speed, which may be necessary for safe movement through short turnouts or crossovers, but preparation to stop because of possible obstruction ahead or because the route may lead to a short spur or a siding blocked with cars.

It is hardly necessary to say that indication No. 13, like several others in the list, would not be used at all on a road on which it was felt that the advantage would not justify provision for displaying the aspects. It seemed to the committee proper, however, to recommend a sufficient number of primary indications to provide for all operating conditions with which it was familiar.

SECONDARY INDICATIONS.

Indications No. 15, Get orders, and No. 16, Take siding, it will be noted, replace four indications in the table accompanying the report of 1908. In the case of the indication for orders the committee recognized a demand for consistent means of giving these indications in connection with block and interlocking signals, in place of flags and lamps displayed at the station on many roads at present. On further consideration, however, it appeared that the requirement is, not to indicate by signal whether 31 or 19 orders are to be received, but to indicate whether the train shall stop for orders (31 orders) or may proceed and pick up orders (19 orders). It follows that a single secondary indication, Get orders, should be sufficient as, if it is given in connection with a primary Stop indication, the meaning will be, Stop—get orders, and in connection with any Proceed indication, Proceed—get orders.

The Take-siding indication may be given by a separate signal (No. 16, exhibit No. 5) located at or near the switch to be used, or by suitable means at a block station, when the train may be required to take the siding adjacent to the station or the next siding beyond that station. In either case, one secondary indication seems to the committee sufficient as, in the second case, the primary indication in connection with which the Take-siding indication is given, will determine which siding is intended; that is, if Stop is indicated, the train must take siding "here," as it has no authority to proceed in the block, while, if any Proceed indication is given, the train may proceed in the block to the next siding beyond the station and take siding there.

Indications Nos. 17 and 18 are inserted as a basis for aspects which it seemed desirable for the committee to provide in order to avoid conflict with the other aspects of its recommended system.

*Report of Committee, presented at the annual meeting of the Railway Signal Association at Louisville, Ky. The first part of the report, with the drawings, was printed last week, pages 695-698.

PRIMARY ASPECTS FOR LESS BUSY ROADS.

Exhibits Nos. 4, 3 and 2, in that order, are designed to show how a road with few requirements may be signaled without conflict with the committee's recommended complete system and may be in position, as its increasing requirements warrant, to develop in an orderly manner to that system. It is assumed that, in the first stage, as there will be few interlockings, limited-speed indications will be unnecessary. As interlockings increase in number and limited-speed indications become desirable, it will be good practice to use the necessary arms and lights on signals giving those indications and omit them on other signals. Finally, as the number of "active" arms increases and the advantages of uniform two-light signaling are more fully appreciated, the necessary fixed arms and lights may be added to round out the complete system shown on Exhibit No. 2.

SECONDARY ASPECTS.

In submitting the aspects for secondary indications No. 15, Get orders, and No. 16, Take siding, and their combinations with primary aspects, Exhibits Nos. 5 and 6, the committee feels that practical and intelligible aspects are offered and that those shown on Exhibit No. 5 provide for the indications recommended. As some roads, however, might wish to give the other primary indications in connection with Get orders or might wish to give the Take-siding indication on a block signal, and as the 45-deg. downward position of the secondary arm was available, the committee deemed it proper to submit the additional aspects, Exhibit No. 6, to be used if desired.

It should be noted that, in both sets of "combination" aspects (Exhibits Nos. 5 and 6), the "primary" arm always takes the same position and has the same color of light to the right of the mast for a given primary indication as in the simple primary aspects; and the "secondary" arm is always down vertically, with no light to the left of the mast, when no secondary indication is given; 45 deg. downward, with a purple light, for the Siding indication, and horizontal, with a red light, for the Order indication, whatever the position of the "primary" arm.

The yellow light to the left of the lunar white in aspects Nos. 9 and 12 is independent of a "secondary" arm (which may or may not be present) and is provided for contrast with the lunar white in the case of these main-track governing aspects; the red and purple lights in aspects Nos. 9 + 15 and 9 + 16 serve the same purpose in addition to giving the secondary indications.

It is to be understood that the secondary arm and light, shown at the top of the mast on Exhibits Nos. 5 and 6, may be applied in connection with any arm of any signal (except the second arm of an automatic block signal, where they could serve no useful purpose).

The committee shows two simple aspects for flag-station signals sufficiently different from any other main-track signal aspects recommended, to make confusion impossible. Some roads use aspects for both indications, others display a signal only when there are passengers, and, for the sake of eliminating one aspect, satisfactory results might also be obtained by displaying a positive signal when there are no passengers, and no signal when there are passengers, with the requirement that trains scheduled to stop should not pass the station in the absence of the aspect indicating No passengers. The committee is of the opinion that either of the three plans would be good practice as no question of safe train movement is involved.

It seemed proper to submit uniform aspects for siding switches and derails (Exhibit No. 5), which explain themselves; but hardly necessary to include the indications on Exhibit No. 1.

RECOMMENDATIONS.

The committee therefore presents Exhibits Nos. 1, 2, 3, 4, 5 and 6 and recommends the adoption of the following conclusions:

First.—That the indications, Exhibit No. 1, are adequate; permit of a uniform system of signaling; are not in conflict with existing systems, and are recommended to the American Railway Association for approval.

Second.—That the Primary Aspects, Exhibit No. 2, are practicable; form an adequate and proper basis for the display of the Primary Indications; provide an excellent means for attaining a uniform, universal system of signaling; and are therefore endorsed by this Association, and submitted to the American Railway Association for such action as may be necessary to enable roads desiring to use them to do so with the approval of that Association.

Third.—That Exhibit No. 4 provides a simple means of signaling; adequate for the needs of many roads and branches, and is a proper method of signaling which, while not providing for uniformity, may be developed through the scheme shown on Exhibit No. 3 into the complete system, Exhibit No. 2. The outlines shown on Exhibits Nos. 3 and 4 are therefore endorsed by this Association and submitted to the American Railway Association for such action as may be necessary to enable roads desiring to use them to do so with the approval of that Association.

Fourth.—That the secondary aspects, Exhibit No. 5, form a simple and proper means of conveying certain necessary instructions, and are therefore endorsed by this Association and submitted to the American Railway Association for such action as may be necessary to enable roads desiring to use them to do so with the approval of that Association.

Fifth.—That the additional secondary aspects in combination with primary aspects, Exhibit No. 6, are suitable and proper aspects for use where desired, and are therefore endorsed by this Association and submitted to the American Railway Association for such action as may be necessary to enable roads desiring to use them to do so with the approval of that Association.

The indications are given by blades operating in the upper right-hand quadrant, as in previous reports. The use of the upper left-hand quadrant was discussed at the New York meeting of the Association on June 8 and was referred to the committee, but it was found necessary to postpone consideration of this subject.

A. H. Rudd, Chairman; C. C. Anthony, H. S. Balliet, H. S. Cable, C. A. Christofferson, C. E. Denney, W. J. Eck, W. H. Elliott, M. H. Hovey, A. S. Ingalls, J. C. Mock, F. P. Patenall, J. A. Peabody, H. H. Temple.

Not concurring, L. R. Clausen, T. S. Stevens.

MINORITY REPORT.

The undersigned cannot support the scheme for Uniform Signaling, recommended in this report, for the following reasons:

1. Two of the four principles upon which it is based have been accepted without full investigation.

(a) The 45-deg. position of the arm shall indicate the position of the next signal in advance.

(b) The location of the arm on the mast shall indicate the speed at which the movement shall be made.

2. The scheme has too many indications and aspects, which are difficult to remember and understand and will be confusing to the train and enginemen.

3. While a multiplicity of aspects is provided they are incomplete. The operation of railway signals to-day is based upon the principle that the absence of a signal where one is usually displayed shall indicate Stop. For example: Indication No. 7 (Proceed—prepare to stop at next signal) is equivalent to saying "Proceed, the next signal is in Stop position." The absence of the 45-deg. position or change to the 90-deg. position gives the engineman permission by inference to assume that the next signal is clear, but this is not covered by an indication. The same criticism applies to other similar

indications. In other words, in order to complete a system of signals along the lines presented it is necessary to provide additional indications.

4. There is no well defined basic principle that may be followed in interpreting the aspects. The scheme has many interpretations which are not covered by, or in harmony with, the standard code.

5. The scheme provides specific information about conditions in advance; notably, the indication of next signal. The Distant signal is used as a repeater of the Home and is bound to teach enginemen to relax vigilance and depend upon advance information which is subject to change, and, therefore, unreliable. The plan of providing repeaters for Home signals will eventually lead to a demand for still further repeaters and checks of various kinds upon fixed signal systems, such as cab signals, and ultimately automatic stops, all of which tend to a laxity in the proper degree of attention on the part of employees.

6. There are too many red lights displayed.

7. The same aspects are used for different indications and different indications for the same aspects.

8. Definite or precise information of considerable variety not required in the practical operation of a railway is provided throughout the scheme. In order to maintain the distinctions much complication is introduced which may lead to considerable difficulty. For example: Instead of one Caution signal there is provided a special signal for each of the several occasions requiring caution.

T. S. STEVENS,
L. R. CLAUSEN.

NEW YORK EXTENSION OF THE PENNSYLVANIA.*

BY CHARLES W. RAYMOND.†

The general plan of the Pennsylvania for traffic facilities at New York may be briefly summarized as follows:

1. The Pennsylvania Tunnel & Terminal Railroad. This line begins near Newark, N. J., crosses the Hackensack meadows, and passes through Bergen Hill and under the North river, the borough of Manhattan, and the East river to the large terminal yard, known as Sunnyside yard, in Long Island City.

2. The electrification of the Long Island Railroad within the city limits.

3. The Pennsylvania freight terminal yard and piers at Greenville, N. J., connecting by ferry with the Bay Ridge terminal of the Long Island.

4. The Bay Ridge improvement of the Long Island, from East New York to Bay Ridge.

5. Yards for increasing the freight facilities in the boroughs of Brooklyn and Queens.

6. The Atlantic avenue improvement in Brooklyn, involving the removal of the steam railway surface tracks and the extensive improvement of the passenger and freight station at Flatbush avenue.

7. The New York Connecting Railroad, extending through a part of the borough of Queens and crossing the East river by a bridge at Ward's and Randall's islands to Port Morris, N. Y.

8. The Glendale cut-off of the Long Island.

9. New piers and docks in Newtown creek at its confluence with the East river.

10. Electrification of the United Railroads of New Jersey Division from Newark to Jersey City.

The New York tunnel extension (P., T. & T. R.R.) is essentially a passenger line, although the company may make it a through route for freight if desired. It will transport passengers to and from the station at Thirty-third street and Seventh avenue, in Manhattan, joining the Long Island system at Sunnyside yard, and, by means of the New York Connecting Railroad, it will form a link in the through traffic line, connecting the whole Pennsylvania system with the New England states. The requirements include handling the heaviest through express trains south and west from the main line as well as the frequent and lighter local-service trains. For through service, electric locomotives will take up the work of the steam locomotives at the interchange yard at Harrison, N. J., and, for excursion and suburban service to nearby towns, provision will be made for electric locomotives, or by operation of special self-propelled motor cars in trains.

The New York Connecting Railroad will be about 12 miles long, and will carry not only through traffic but also local freight to and from Sunnyside yard and Brooklyn, and all points on Long Island.

The initial equipment of the Western division of the Long Island Railroad for electric traction has been made in advance of the opening of the tunnel line to take care of the requirements of the Atlantic avenue improvement. This improvement involved the elimination of grade crossings within the city of Brooklyn and the conversion of the railway line which was previously on the surface of the streets to part subway and part elevated line from the Flatbush avenue terminal to East New York station, 5¼ miles. One of the requirements of this improvement was that the motive power should be changed to some form of power not involving combustion. This led to the adoption of electricity, and, in order to meet operating necessities, involved the electrification of connecting lines beyond the improvement proper, so that local service could be handled to the end of the runs without changing the motive power. The extent of the electrification thus required was found to be about 100 single-track miles. This electrification was completed in the summer of 1905, upon the completion of the Atlantic avenue improvement proper. Plans for additional electrification on the Lond Island were made, and work is now in progress on the extensive additions required to couple up the tunnel extension with the various lines centering at the Long Island City terminus.

The Bay Ridge improvement of the Long Island comprises the readjustment of the right of way and the establishment of new grades to do away with grade crossings from the freight terminal at Bay Ridge to a junction with the New York Connecting Railroad at East New York, 10.4 miles. It also provides for the re-location of the line and the elimination of grade crossings on the branch running to Manhattan Beach, 3.7 miles. The work is being executed without interrupting traffic; in all, about 75 grade crossings will be abolished. This improvement became necessary in order to provide for the rapid extension of population into the suburban districts and for the present and future requirements of the section, to establish municipal conveniences and facilities, and to open additional streets across the right of way. The line has been built in cuts and on embankments, there being about 6.4 miles of the former, 3.3 miles of the latter, and a tunnel, 3,500 ft. long, where the line crosses the Atlantic avenue improvement.

The Atlantic avenue improvement, as mentioned above, involved the removal of tracks from the street surface for about 5¼ miles. This was done by a series of elevated and subway structures, there being about 2.1 miles of the former, 2.4 miles of the latter, and 0.8 miles of approaches, eliminating more than 90 grade crossings. One of the reasons for establishing a combination elevated and subway line was that, at the time the improvement was projected, no underground railway in the country, of similar length and carrying a heavy volume of local traffic, was operated by electricity, and public sentiment was against the operation of the entire length of the line underground by steam power. This improvement also provided for depressing the entire Flatbush avenue station and a freight yard. As the work progressed, the original plans for the station were greatly enlarged, the remodeled station covering about 2½ acres.

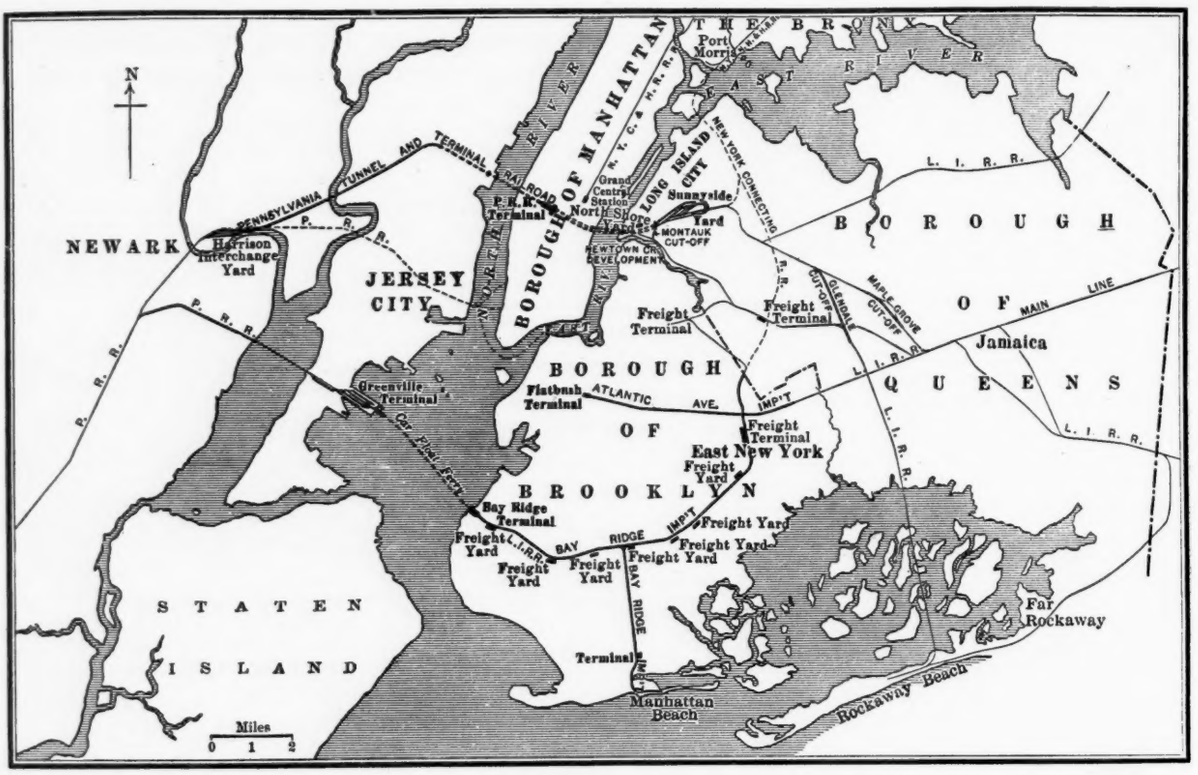
The Glendale cut-off will materially shorten the route and

*From the *Proceedings* of the American Society of Civil Engineers.
†M. Am. Soc. C. E.; Brigadier-General, U. S. Army, retired; chairman, Board of Engineers, Pennsylvania Tunnel & Terminal R. R.

running time from New York through the tunnels to Rockaway Beach.

Passengers to and from the lower part of Manhattan will be carried by the steam line between Newark and Jersey City and cross the North river by ferry or the Cortlandt street tunnels of the Hudson & Manhattan. Eventually, the old main line will be electrified and supersede the steam service between Newark and Jersey City.

The Greenville yard is the most important point for the receipt, transmission and distribution of freight. From this point freight can be transported, without breaking bulk, by a comparatively short car-ferry to the Long Island Railroad terminus at Bay Ridge, and thus a very large part of the Pennsylvania's floatage in New York harbor and the East river will be abolished, the floatage distance being reduced in the case of the New England freight from about 12 to 3 miles. This traffic will be routed from Bay Ridge via the Long Island Railroad to a connection with and thence over the New York Connecting Railroad to the New York, New Haven and Hartford at Port Morris, N. Y.



Pennsylvania Improvements in the New York District.

In the boroughs of Brooklyn and Queens 11 new local delivery yards, having a combined area of about 89 acres, have been established, and three existing yards are to be improved and enlarged so as to give a combined area of about 28 acres Of these new yards, the Bay Ridge freight terminal, containing about 33 acres, is the largest; its functions have been described above. There is a freight terminal at East New York 200 ft. wide and a mile long, containing about 23 acres, which will be the distributing point of freight for the entire East New York section. This yard is depressed, and will be crossed by six viaducts carrying city streets. The North Shore freight yard, containing 5 acres, is connected with the Montauk division by an overhead construction, the Montauk freight cut-off, whereby all freight traffic to Jamaica may be kept out of the way of the Jamaica passenger traffic from the tunnels.

The larger part of the electrification of the Long Island Railroad and the elimination of grade crossings within the built-up city limits, the Atlantic avenue improvement, and the yard and piers at Greenville, have been completed. The Sunnyside yard and the Glendale cut-off will be completed during the next twelve months. On the Tunnel & Terminal Railroad, the embankment and bridge work across the Hackensack meadows and all the tunnels and excavation from the west side of Bergen Hill to Long Island City, except a short section near the eastern end of the line, have been completed. The New York station and other buildings and facilities connected therewith are well advanced. The laying of the track, the electrification of the line, and the installation of the signaling and lighting systems are under way. It is anticipated that the line will be ready for operation in the spring of 1910. A large part of the right of way for the New York Connecting Railroad has been obtained, and more than $3,000,000 has been spent by this railroad. The piers and docks at Newtown creek and the electrification of the line from Newark to Jersey City are not yet actively under way.

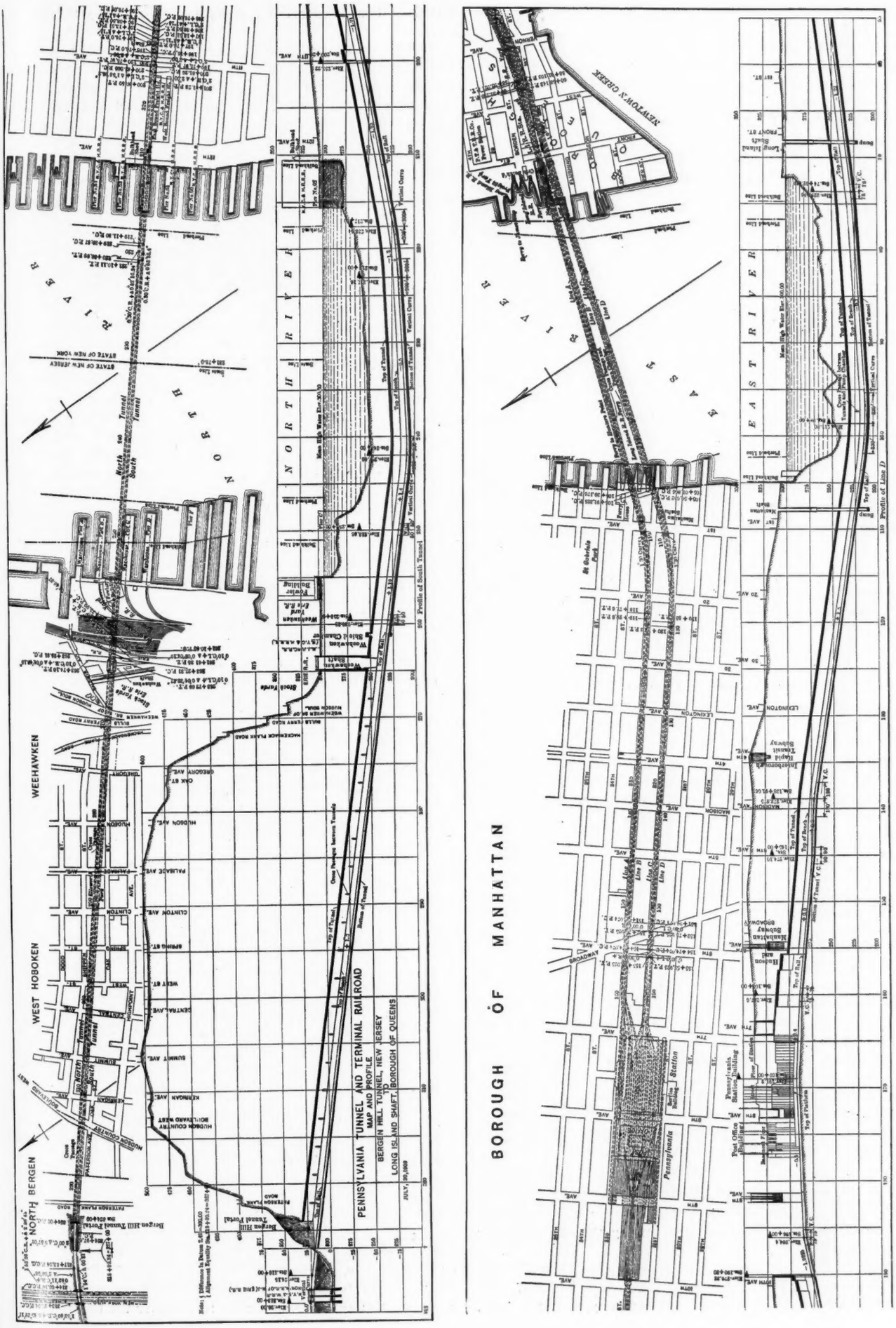
ESTIMATED COST.

The following estimate of the cost of the improvements in the New York district when fully completed is based on the best information now available:

New York tunnel extension and station, including interchange yards at Harrison, N. J., and Sunnyside, L. I., P. T. & T. R. R. Co.	$100,000,000
Long Island Railroad electrification; Bay Ridge and Atlantic avenue improvements; Glendale cut-off; freight yards, and new equipment	35,000,000
New York Connecting Railroad, to be built jointly by the Pennsylvania and the New York, New Haven & Hartford	14,000,000
Pnensylvania Railroad improvements in New Jersey; electrification of line from Jersey City to Park Place, Newark; Greenville freight line and terminal on New York bay	10,000,000
Total	$159,000,000

CORPORATE ORGANIZATION AND FRANCHISE CONDITIONS.

As the tunnel extension lies partly in New Jersey and partly in New York, it was necessary to charter two companies. The New Jersey corporation was the Pennsylvania, New Jersey & New York, and the New York corporation, the Pennsylvania, New York & Long Island. These organizations were completed early in 1902. Subsequently, after the tunnels had been joined under the North river, the companies were consolidated, on June 26, 1907, and thereby formed the present company under



Map and Profile; New York Extension of the Pennsylvania.

the name of the Pennsylvania Tunnel & Terminal, a corporation of both states.

The franchise for the line from the boundary line between New York and New Jersey, in the Hudson river, to the eastern terminus at Sunnyside yard, grants rights in perpetuity, subject, however, to a periodic re-adjustment of payments at intervals of 25 years, for the following:

Two tracks under the Hudson river, Thirty-first street, and the East River. The company is permitted on notice within 10 years to give up the right to these two tracks.

Two tracks under the rivers and Thirty-second street, with a right for two additional tracks in Thirty-second street, west of Ninth avenue, and one additional track between Seventh and Fifth avenues, in Manhattan.

Two tracks beginning at the station terminal site at Thirty-third street and Seventh avenue and thence running under Thirty-third street and the East river, with a right for one additional track on Thirty-third street, between Seventh and Fifth avenues.

The station at Seventh avenue.

The more interesting points of the franchise conditions are as follows:

The company had to begin construction within three months after obtaining the necessary consents and complete the line within five years after construction began, except the route under Thirty-first street, for the completion of which the company is allowed 10 year after the completion of the remainder of the line.

The annual payments to the city may be summarized as follows:

	First 10 years.	Next 15 years.
For river rights	$200	$200
For tunnel rights in Manhattan, being 44,341 ft. (partly estimated) of single track	22,170	44,341
For tunnel rights in Queens borough, being 8,100 ft. (partly esimated) of single track.	2,025	4,050
For street rights on 31st and 33d streets, north and south of terminal.	14,000	28,000
Total per year	$38,395	$76,591

If the route under Thirty-first street be used, these amounts will be increased by $16,653 for the first 10 years, and by $33,305 for the next 15 years.

The amounts to be paid are to be readjusted at the end of 25 years; and thereafter at intervals of 25 years. If the city and the company shall not agree upon the readjusted rates, they are to be determined by the supreme court of the state.

Tunnel excavations had to be made without disturbing the surface of the street, except in the portions in front of the terminal station, and in Queens borough. The Rapid Transit Board (the predecessor of the present Public Service Commission, First District) could, wherever conditions elsewhere make surface excavation necessary for efficient construction, grant the right for such excavation.

The motive power was to be electricity, or such other power not involving combustion as may be approved.

The company was to have no power to carry on merely local traffic, except with the approval of the board and for additional consideration to be paid the city. Traffic is defined as local which begins and ends in the city within five miles of the terminal station on Seventh and Ninth avenues.

The company was not to oppose the construction of any rapid transit railway along or across the same routes which do not actually interfere with the authorized structures of the company.

The company was bound to maintain and strengthen all parts of its railways under streets or avenues so that they would support safely any structures superimposed or which may hereafter be superimposed thereon by the city or under public authority.

This franchise was passed and approved on December 23, 1902. Subsequently, an agreement, dated June 21, 1907, was entered into by the city, the tunnel company, and the Long Island Railroad, covering the construction of the Sunnyside yard.

By this agreement 50 streets or avenues were discontinued or closed, the grades of 16 streets or avenues in the borough of Queens changed, and the portions of streets and avenues thus discontinued and closed, most of which had not yet been opened for public use, were sold to the railway companies.

The agreement required the companies to construct, at their expense, four viaducts or bridges over their tracks and terminal development, three with roadways 42 ft. wide, one with a roadway of 60 ft. wide, and each to have two sidewalks 10 ft. wide, the work to include the paving of the roadways and sidewalks. The companies were further required to pay one-half the cost of the construction of the foundations, abutments, piers, superstructures, and approach of an additional viaduct or bridge over the Sunnyside yard, to have a roadway not more than 60 ft. wide and two sidewalks each 10 ft. wide, and to grant the city a perpetual easement for the continuance of the same in the location on which it should be constructed.

The companies were required to bear all the expense of changes of grade in the streets and avenues, except those made necessary by the construction of the viaduct or bridge to be paid for in part by the city; to indemnify the city against all liability for any and all damages which may accrue on account of any street which may be closed or the grades of which may be changed in pursuance of the agreement; to assume all liabilities by reason of the construction or operation of the railways or the construction of the viaducts, and to save the city harmless from any liability whatever, to either persons or property, by reason of the construction or operation of the railways or the construction of the viaducts. The companies were also required to take care of sewers, etc., affected by the work.

ENGINEERING ORGANIZATION.

Samuel Rea, Vice-President, has general charge of all matters involved in the designing and execution of the project.

Before the beginning of the work the management appointed a board of engineers which was instructed to examine into the project, to pass on its practicability, to determine on the best plans for carrying it out, to make an estimate of its cost, and, if the work were undertaken, to exercise general supervision over its construction.

The board was organized on January 11, 1902, when it held its first session, and continued until April 30, 1909, when it was dissolved, its work having been completed. The board, when organized, was composed as follows: Col. Charles W. Raymond, Corps of Engineers, U. S. Army, chairman; Gustav Lindenthal, Charles M. Jacobs, Alfred Noble, and William H. Brown.

George Gibbs was appointed a member on April 9, 1902. Mr. Lindenthal resigned on December 15, 1903, and Mr. Brown resigned on March 1, 1906. William R. Mead, of McKim, Mead & White, architects for the terminal station, was associated with the board for the consideration of architectural subjects. Robert H. Groff, secretary of the company, was also secretary of the board until his resignation on January 31, 1907. William Couper was acting secretary from April 15, 1907, to April 30, 1909. S. Johannesson, Assoc. M. Am. Soc. C. E., was engineer assistant to the chairman from December 1, 1905, to April 30, 1909.

For construction, the line was divided into four parts: the Meadows division, the North River division, the terminal station, and the East River division. A chief engineer appointed by the management had charge of the construction of each division. Architects were employed to design the terminal station building and superintend its erection, and structural engineers to design and erect steel structures and facilities, and carry on the work under the direction of a chief engineer of the company. Committees, consisting principally of officers of the Pennsylvania, co-operating with the regular engineering organization, were appointed to consider the operating fea-

tures of the project, so that the experience of the Pennsylvania's organization might be utilized in the work.

GENERAL DESCRIPTION.

The following summary description of the various divisions of the line is intended to give a comprehensive idea of the general features of the project. Full details will be given in succeeding papers.

Meadows Division.—Chief engineer until March 1, 1906, William H. Brown, chief engineer, Pennsylvania, when he retired from active service with the latter company; since then, Alexander C. Shand, chief engineer, Pennsylvania.

This division consists of an interchange yard at Harrison, near Newark, N. J., adjoining the tracks of the present New York division of the Pennsylvania, and a double-track road across the Hackensack Meadows to the west side of Bergen Hill, 6.04 miles. The construction is embankment and bridge work, including bridges across the Pennsylvania, the Erie, and the Lackawanna, and the Hackensack river.

North River Division.—Chief engineer, Charles M. Jacobs.

This division commences at the west side of Bergen Hill and passes through the hill in two single-track rock tunnels to a large permanent shaft at Weehawken, near the west shore of the North river, and thence eastward 224 ft. to the Weehawken shield-chamber. It then passes under the river through two cast-iron, concrete-lined, single-track tunnels, with outside diameters of 23 ft., to a point under Thirty-second street, near Eleventh avenue, in New York, and thence through two single-track tunnels of varying cross-section, partly constructed in cut-and-cover, to the east side of Tenth avenue. It then passes into the station yard and terminates at the east building line of Ninth avenue. The work included the station yard excavation and walls from Tenth avenue to Ninth avenue, and the retaining walls and temporary underpinning of Ninth avenue. The aggregate length of the line in this division is 2.76 miles.

New York Station and Approaches.—George Gibbs, chief engineer of electric traction and station construction.

The station, with its approaches, extends from the east line of Tenth avenue eastward to points in Thirty-second and Thirty-third streets, respectively 292 ft. and 502 ft. east of the west line of Seventh avenue. This division included the construction of subways and bridges for the support of Thirty-first and Thirty-third streets and Seventh, Eighth and Ninth avenues, the station building between Seventh and Eighth avenues, the foundations for the postoffice to be erected west of Eighth avenue, the service power house in Thirty-first street between Seventh and Eighth avenues, the power house in Long Island City, the traction system, tracks, signals, and miscellaneous facilities required in the physical construction of the entire terminal road ready for operation. McKim, Mead & White were the architects for the station and Westinghouse, Church, Kerr & Co. executed the structural engineering work, both in the station and for the support of the streets, as well as the construction of the subways.

The station is of steel skeleton construction with masonry curtain walls, all supported by a system of columns extending to a rock foundation. This building covers two city blocks and one intersecting street, and has an area of about 8 acres. It is 774 ft. long, 433 ft. wide, with an average height above the street of 69 ft., and a maximum of 153 ft. The main waiting-room is 277 ft. long, 103 ft. wide and 150 ft. high. The concourse is 340 ft. long and 210 ft. wide.

The level of the track system below the street surface varies from 39 to 58 ft., and is from 7 to 10 ft. below mean high water in the harbor, thereby necessitating the establishment of an elaborate system of drainage over the entire station yard area. Access to the street is gained by elevators and stairways.

To accelerate the loading and unloading of the trains, high platforms will be constructed in the station on a level with the floors of the cars, in order to avoid the use of car steps and increase the traffic capacity of the station.

There will be 21 standing-tracks at the station and 11 passenger platforms, providing 21,500 ft. of platform adjacent to passenger trains. Within the station area, which from Tenth avenue to the normal tunnel sections east of Seventh avenue comprises 28 acres, there will be a total of about 16 miles of track.

The power house for the operation of the tunnel line and the Long Island Railroad is on property in Queens borough adjoining the present Long Island Railroad station near the East river, and was constructed under the chief engineer of electric traction and station construction. As at present designed, the dimensions of the structure are 200 ft. x 262 ft., outside measurement. It can accommodate six generating units of 5,500 k.w., the standard adopted for future work, and two of 2,500 k.w. for lighting the tunnels. The ultimate capacity of this station when extended will be about 105,000 k.w.

East River Division.—Chief engineer, Alfred Noble.

This division begins at the eastern limits of the New York station and also includes the excavation work and retaining walls for the station site and yard, to the track level, westward to Ninth avenue. It extends eastward from the station under Thirty-second and Thirty-third streets through tunnels partly three-track and partly so-called twin tunnels to Second avenue; thence the line curves to the left under private property to permanent shafts a few feet east of First avenue. Four single-track, cast-iron, concrete-lined tunnels, with outside diameters of 23 ft., pass under the East river, and, after passing through permanent shafts near the bulkhead line, reach the surface in Long Island City from 3,000 to 4,200 ft. east of the East river. The tunnel portals are in Sunnyside yard, which extends to Woodside, the easterly end of the division, and the yard grading with its buildings and a number of city viaducts crossing it were executed under this division. The total length of the division is 4.48 miles.

The total length of the entire line is 13.66 miles. There are 6.78 miles of single-track tube tunnels, and the average length of the tunnels between portals is 5.56 miles.

Details have been omitted from the foregoing description, as they can be treated better and more fully by the constructing engineers in succeeding papers.

It was desirable to make the tunnels between the bulkhead lines of the rivers as straight as possible, and it was necessary to place them at sufficient depth below the dredging plane of the war department (which in the North and East rivers is 40 and 26 ft. below mean low water, respectively) to insure them against possible injury from heavy anchors or sunken vessels. Furthermore, they had to pass under the piers and bulkheads of Manhattan at a depth sufficient to make it certain that they would not affect the stability of those structures. Another consideration influencing the establishment of the depth of the tunnels below the bottoms of the rivers became important as soon as the method of construction by shields with compressed air was adopted, namely, the necessity of providing sufficient cover to guard, as far as possible, against blow-outs during construction.

The tunnels under the city, connecting the sub-river tunnels with the terminal station were located so as to give as favorable grades as possible. The provision of the franchise requiring the tops of the tunnels to be at least 19 ft. below the street surface, which had been suggested by the company to permit of future subways, had no effect on their location, as other conditions required them to be at a greater depth.

The line extending westward from Bergen Hill had to be established so as to give ample head-room at the numerous bridges over the railroads and highways which it crosses.

Eastward from the East river tunnels the grades were established so as to rise as uniformly as possible to the level of the Sunnyside yard.

The general features of the line, as finally adopted and constructed, are as follows:

The maximum grade west of the terminal station occurs on

the New York side of the North river, and is 2 per cent. in the west-bound and 1.93 per cent. in the east-bound tunnels; the ruling grades (for the ascending traffic) are 1.32 per cent. in the west-bound and 1.93 per cent. in the east-bound tunnels. In the tunnels east of the terminal station, the ruling grade is 1.5 per cent. for both east-bound and west-bound traffic. There is, however, descending with the traffic a short section on a grade of 1.9 per cent. These grades would be objectionable with steam locomotives under a heavy traffic, but the development of the electric locomotive has rendered possible the operation of grades which would have formerly been considered prohibitive.

From the junction with the Pennsylvania, near Harrison, N. J., to Woodside, Long Island, 13.66 miles, there is an average of 1.5 curves per mile; the line having a total curvature of 230 deg. The maximum curvature is 2 deg.

The local passenger and freight traffic of the Pennsylvania and of other railways reaching the west shore of the North river is conducted by car-floats and ferryboats which deliver their loads at piers on the Manhattan waterfront and elsewhere in the harbor. These boats obstruct and endanger the free navigation of the channels and occupy space along the waterfront greatly needed for the accommodation of the long-distance water-borne commerce, especially on the North river.

In the East river the importance of ferryboats as a means of traffic distribution has already been greatly reduced by the construction of bridges and tunnels which provide for the greater part of the passenger and vehicular traffic. The North river, however, by reason of its greater width and the comparative slowness of its currents, is by far the more important waterway for the use of ocean-going vessels of the larger classes. In this river the conditions for the construction of bridges, within the limits of commercial convenience, seem to be practically prohibitory. Tunnels, for the transportation of passengers and the diversion of the freight traffic from the inner waters of the harbor, are apparently the only available means of relief.

When the new line is in operation, a very large part of the New York passenger traffic of the Pennsylvania will be carried to the New York station at Seventh avenue and Thirty-third street and the rest will go to Cortlandt street through the Hudson & Manhattan tunnels. Thus a large portion of the Pennsylvania passenger ferry traffic, which amounts to more than 91,000 passengers daily, will be practically eliminated from the water-transportation problem. In addition, a large part of the Long Island Railroad's passengers will use the station at Seventh avenue and Thirty-third street, and its ferry traffic will be reduced accordingly.

The new arrangements for the transfer of freight from Greenville to Bay Ridge will relieve the inner waters of the harbor of a large volume of obstructive car-float traffic. There appears to be no reason why this traffic should not be eventually conducted through tunnels under the outer harbor, should future transportation conditions justify the enormous cost of such structures.

While these new arrangements greatly reduce the passenger and freight water transportation, they have no effect on the large vehicular traffic across the North river which must continue to be conducted by ferries until it can be otherwise provided for. As long as these conditions exist, ferryboats must be used in large numbers and continue to obstruct the North river. This difficulty probably cannot be overcome by the construction of bridges, as in the case of the East river, but it does not seem too much to expect that, eventually, tunnels to provide for the vehicular traffic, like the Blackwall tunnel under the Thames, will be established under the North river.

It would be interesting to estimate the increase in railway traffic capacity resulting from these improvements, but the data required for this purpose are not available. Some idea of the increase in passenger traffic capacity resulting from the establishment of the tunnel line may be obtained by comparing the proposed daily train movements for the new station with the train movements at other important railway stations. The daily train movements of six such stations are given in the following table:

	Total trains in and out for 24 hours.	Movement at maximum hour.
Jersey City	281	29
Broad Street Station, Philadelphia	538	48
Union Station, St. Louis	462	89
South Terminal Station, Boston	861	87
Grand Central Station, New York	357	44
*Pennsylvania Station, New York	500	50

*Proposed train service when station is opened, the ultimate capacity of the station being in excess of 1,000 trains per day.

The freight capacity of the Pennsylvania system at New York has been greatly enlarged by the construction of the Greenville yard and the facilities connected therewith, but it is impossible to estimate the amount of this increase; however, it is worthy of remark that, during the period from 1900 to 1906, the freight traffic density on the directly-operated lines of the Pennsylvania increased from 3,268,330 to 4,742,081 ton-miles per mile of road, a growth of nearly 50 per cent. Doubtless the improved freight facilities of the New York district had a large influence in the development of this increase.

One of the most interesting points connected with this development of traffic facilities is its influence on the relative distribution of population in the different parts of the metropolitan district. In 1907 the population per acre of the different divisions of Greater New York was reported as follows: Manhattan, 157; Brooklyn, 29; Bronx, 14; Queens, 3; Richmond, 2. The effect of new lines connecting some of these districts, and sections of New Jersey not far from the North river, with the business center of the city will undoubtedly be to increase greatly their population density. It does not seem probable that the population density of Manhattan will be sensibly reduced by these improvements, for they stimulate the increase of population, and apparently no increase of transportation facilities can keep up with the growth of the city. The population of a great commercial city must be congested near the business center. This is a necessary condition of its existence. All that can be done to meet this condition is to provide all possible facilities for moving the people into and out of the business districts and within its limits.

When the Pennsylvania tunnel extension is in operation the easiest and quickest way for the passenger to reach the city from Newark will bring him into the Pennsylvania station at Seventh avenue and Thirty-third street. The schedule fast time from Newark to the New York Cortlandt street station is now 25 minutes. This may be reduced to about 18 minutes by the use of the Hudson & Manhattan tunnels, and while this involves inconvenience in changing transportation at Jersey City, yet it brings the traveler three blocks nearer Broadway. The time from Newark to the Pennsylvania station will be about 17 minutes, and the trip will be made without change of transportation, so that, undoubtedly, by far the greater part of the Pennsylvania's passenger traffic desiring to reach the shopping and hotel center of the city will go to the new up-town station.

The effect of the tunnel extension in increasing the volume and rapidity of the up-town movement and the real estate values will be very great; indeed, its influence is already apparent, although the line is not yet opened for traffic. With the extension of the present subway down town on the west side with direct connections to Brooklyn, and up town from Forty-second street to the Bronx, with connections to permit convenient transfers between these two straightaway subways —one on the east side and the other on the west side of Manhattan—will make the Pennsylvania station a great center for receiving and distributing passenger traffic between all the boroughs of the city and outlying points. The new postoffice to be established adjacent to the terminal station will also greatly assist in accelerating the uptown movement.

UNIFORM DEMURRAGE RULES.*

The movement for uniform demurrage is in the interest of the average shippers—the multitude who are never the beneficiaries of discrimination. It is not a railway movement, although some wise railway men are very friendly to it. Its basic idea is this: that railways should compete in rates and in excellence of service, if we can get them to, but that they should not compete in the allowance of idle time for cars if it can be prevented. The railway which competes in rates is giving something which belongs to it to give. The railway which improves its service is robbing nobody, but is benefiting both its customers and its competitors. But the railway which grants an extra and unnecessary day's idle time for a car is giving that which belongs to it no more than to all the other cars and to all the shippers in the country. There is little or no difference of opinion as to the amount of the daily charge. The trouble comes in determining the amount of the free time. The charge generally, the country over, is $1 per day, this being varied by the charge of 25 cents after an average free time of six days which obtains upon cotton cars in New England, and by the charge of $6 per day after a straight free time of two days which obtains upon intrastate shipments in California.

This movement began at the last annual convention of the National Association of Railroad Commissioners at Washington a year ago.

The committee on the subject, Franklin K. Lane, chairman, has representatives from forty state commissions. This committee has worked diligently. The proposed code is not in final form, but it is already being vigorously opposed by many interests, which, either rigidly or wrongly, feel that as to them some special exception or exemption must be made.

The difficulties of securing the adoption of the proposed code when it shall finally be framed are very great. Twenty-eight states have promulgated demurrage rules, which have the force of law as to shipments wholly within such states, and which can be changed only by action of either the state commissions or the state legislatures. Fourteen of the states have adopted demurrage rules by statute. Thirteen more have adopted demurrage rules by action of their state commissions. One state has a code framed partly by statute and partly by its commission. Therefore, before the proposed code can become applicable to all state shipments, there must be affirmative action by not less than fifteen state legislatures and by fourteen state commissions.

With regard to interstate shipments the adoption of the proposed code will be slightly less difficult. The Interstate Commerce Commission has not the power to direct the railways to adopt it for application to interstate shipments, but the railways themselves are free to substitute the new code for their present rules upon 30 days' notice. To compare this or any code with all of the varying sets of rules now obtaining in the country would be an immense task, as the present demurrage rules are remarkable for their indefiniteness and variety.

I want to get you to agree to two or three fundamental propositions. First, no shipper ought to pay very much demurrage. In this you all will agree. It is the one proposition which has the united support of all shippers and all railway men. The exemption from demurrage which is gained by broad and ambiguous exceptions in the rules, and by unfair application of these exceptions, is bad for the shipping public generally. It results in the detention of cars when they are most needed.

Another proposition is this: the carriers of the country should serve their shippers absolutely without discrimination. The general counsel of one of our great lines not long ago, in discussing a questionable arrangement to which his line was a party, agreed frankly that no defense could be made except this, that such arrangements were general on the part of other carriers in the same district, competing with that district in the markets of the country. He said: "We ought to clean all those things out, but if you clean them out as to this industry only, you will place it at a disadvantage to other industries on our line * * * and many shippers will be seriously injured."

Probably many of you feel the same way. There should be no discrimination in the crusade against discrimination. To impose the virtue of the statute upon one competitor and to leave other competitors free, is to make discrimination worse rather than better.

If any of you do not heartily agree to the proposition that railways should not discriminate, I am sure that, at least, each of you will agree that no discrimination should be made against him, but if discrimination is to be allowed at all you may be certain that nearly all of you will be on the losing side. You cannot afford to risk your businesses on a chance in a distribution of railway favors, any more than you can afford to take any other needless risk. Self-interest serves as the foundation of a good deal of virtue in this world, and the business man who does not stand with the Act to Regulate Commerce against all discriminations because he does not want any unfair advantage over his competitor may well consider whether he should not stand with it because it is his only insurance that his competitor will not have an unfair advantage over him. If your elevator is full of grain, your contracts calling for delivery at the central markets, and the railway failing to furnish cars for loading—that is car-shortage. If you buy empties away from your neighbors, your neighbors in turn will buy them from you, and you will both have lost. It costs money and is bad for the morals of the men who sell them to you. So far as the purchase of grain is concerned you might as well be located in a desert.

It is necessary that in each locality the demurrage rules applicable to both state and interstate shipments should be identical, and very generally this will be found to be the case. It is impracticable for the carriers to operate two sets of demurrage rules in the same localities applicable to the same mass of equipment. Demurrage rules are operated through the medium of very busy and not very well-paid clerks. If they are bound to distinguish between state and terested in preventing the imposition of unnecessary expenses demurrage rules, the liability of inaccuracy is more than doubled, while the expense of keeping the demurrage accounts will also be more than doubled. As shippers you are interested in preventing the imposition of unnecessary expenses upon the carriers that serve you, for the reason that finally such expenses will find their way into your freight rates or out of service given you. Either your freight rate will be increased or your service will be decreased to the precise extent of the addition to the operating expenses of your carriers—at least to the precise extent, and perhaps a little more to make up for wear and tear and bookkeeping.

Moreover, with two sets of rules, one applicable to state shipments and the other applicable to interstate shipments, you are called upon to scrutinize the charges made against you to determine that each shipment has been placed in the proper class. If the state rules are more liberal than the interstate rules and you accept a bill for demurrage which classifies your interstate shipment as a state shipment, and therefore reduces the charge, you will have criminally violated the Act to Regulate Commerce and the Elkins Act in something more than a merely technical sense. I need not tell you that the question as to whether a given shipment is interstate in character is frequently exceedingly nice, calculated to puzzle lawyers and to divide courts. Under these circumstances the only course of absolute safety for either carrier or shipper is to remove the danger of

*Extracts from an address by John H. Marble, attorney of the Interstate Commerce Commission, before the annual convention of the Grain Dealers' National Association, at Indianapolis, October 7.

guessing inaccurately by having the demurrage rules identical for both state and interstate shipments.

The states freely exercise the power to make state demurrage rules. The federal government pursues a different course, leaving to the interstate carriers the duty of framing the rules, subject to change, by order of the Interstate Commerce Commission, only when they are unjust or unreasonable. The result is that the demurrage rules break into as many conflicting codes as there are state jurisdictions exercising their power. The state-made codes, with possibly one exception, are uniformly too liberal for the general good of the shipping community in their permission to shippers to hold cars without expense, some codes yielding to one local interest and some to another. So all the rules become, not excessive in their changes, but too liberal for the public good, and, so varied in their provisions and in their application that a shipper needs both a lawyer and a detective before he can venture a guess as to the demurrage rate actually paid by his competitor in some other state. If you care to make the right actual, which according to our federal courts is yours theoretically, to know from the tariffs not only what rate you must pay, but also what rate is paid by your competitor, you must be friendly to the movement for uniformity of demurrage rules and for uniformity in their enforcement.

There is, as the railways do business, as truly one lot of cars for the entire country as there is one lot of blood in a body or one lot of water in a lake. The car that is loaded with cotton in Oklahoma may go to New Orleans for the export trade; it may go to New England for the domestic trade; it may go to any one of a hundred destinations. It is a car that might be used in Iowa to carry corn, in the Dakotas to carry wheat, in any city to carry general merchandise.

When a state legislature or a state commission or a traffic manager is asked to give increased free time to some shipping interest, the matter is discussed as if it were a proposition of increasing a railway service or reducing a railway rate. That is, it is discussed as if it were a question between a carrier on one side and certain shippers on the other. It is not such a question. It is one between a local interest and the general public good. When a state or a railway grants additional idle time for cars, the rule does not apply to equipment dedicated to the use of that state only, or owned by that railway only. It applies to that portion of the general body of equipment which may for the day be serving that state. It applies to cars owned beyond state lines, and engaged in serving the shippers of all the states. When a local rule gives an additional day for the loading or unloading of any class of traffic it depletes the general car supply, not the local supply, to just that extent.

It is the same with box-cars that it is with buffalo and forests, and fish. If they are not to disappear when they are most needed, you must have a national conservation policy, and not leave them to the mercy of merely local interests. There cannot be three or four, or ten, or even an unlimited number of days free time on cars at this point or that without depleting the car supply of the shipper of grain in the country beyond the Missouri. This is not a movement which calls for self-sacrifice, but rather for that enlightened attitude which understands that in matters affecting common interests, narrow selfishness and greediness do not make for wisdom or even for individual profit. Uniform demurrage rules must be stricter than the local rules they supersede if they are to do any good. To copy all the provisions for idle time now in the various local codes, thus making each one available to all shippers, would be doubtful progress, although it would have the merit of being non-discriminatory. The effort must be to make the cars move rather than to continue the devices for allowing them to be held stationary. To this end, shippers must expect to see the free time they now enjoy shortened toward, if not to, a limit of two days. As each shipper readjusts himself, he can be assured that his competitor in whatever state he may be, is making a like adjustment, and that the prosperity of the entire country, in which all shall share, will be increased by the change.

FOREIGN RAILWAY NOTES.

According to a consular report coal deposits have been found in Siberia, near Kemerovo, Tomsk. The vein is in places five miles wide and many feet thick.

A consular report describing some concrete buildings in Swatow, China, says that in some cases split bamboo poles have been used for reinforcement. This is successful in preventing cracks and strengthening the walls, and the bamboo does not rot.

We are informed that in consequence of a rise in the prices charged by the breweries for beer, a conference of three of the Prussian State Railway managements has been held to decide what the station restaurants may charge at retail, and that it is decided that they may require 10 pfennige (2.4 cents) for a mug holding two-tenths of a litre, and 15 pfennige for seven-twentieths litre, which may be called a schooner.

THE OPERATIONS OF FRENCH RAILWAYS IN 1908.

Name of road.	Nord.	Est.	Ouest.	Orleans.	Paris, Lyons & Medit.	Midi.	Total.
Mileage operated, miles	2,342	3,110	3,650	4,587	5,927	2,391	22,007
Receipts:							
Fast train traffic	$23,215,545	$18,730,425	$23,714,289	$24,472,974	$46,070,395	$10,770,760	$146,974,389
Slow train traffic	30,844,475	26,697,025	18,714,377	30,234,436	55,221,856	13,819,282	175,531,431
Income from other sources	784,564	751,992	1,126,480	537,444	1,427,722	536,663	4,951,645
Total	$54,844,584	$46,189,442	$43,555,146	$55,344,854	$102,719,973	$20,126,707	$327,457,465
The above is divided as follows:							
Passenger, per cent	32.74	30.38	42.49	31.4	31.22	35.06	32.93
Fast freight, per cent.	9.59	10.18	11.96	12.9	13.63	7.81	11.95
Slow freight	56.24	57.81	42.97	54.73	53.76	54.99	53.61
Other sources, per cent.	1.43	1.63	2.58	0.97	1.39	2.14	1.51
Expenses:							
General office and overhead chrgs	$2,730,610	$2,349,019	$2,713,089	$2,837,610	$4,428,612	$1,739,928	$16,798,868
Operating	9,264,728	10,057,609	10,207,999	8,447,963	17,784,646	4,355,890	60,118,839
Equipment	13,749,945	9,993,506	11,003,715	12,182,023	21,651,361	4,524,213	73,104,765
Permanent way and buildings	4,900,366	3,713,676	3,893,386	5,445,391	9,906,134	1,925,831	30,786,784
Miscellaneous	953,684	105,920	1,428,455	868,125	747,916	.....	4,104,100
Total	$31,799,293	$27,219,730	$29,246,644	$29,981,116	$54,518,669	$12,545,862	$184,913,376
Expenses divided as follows:							
General office and overhead charges, per cent.	8.65	8.63	9.28	9.52	8.12	13.87	9.09
Operating	29.32	36.95	34.90	28.37	32.62	34.72	32.51
Equipment	43.51	36.71	37.63	40.90	39.72	36.06	39.53
Permanent way and bldgs, pr. ct.	15.51	17.32	13.31	18.29	18.17	15.35	16.65
Miscellaneous, per cent.	3.01	.39	4.88	2.92	1.37	.....	2.22
Net profit	$23,044,291	$18,951,712	$14,308,502	$25,463,738	$48,201,304	.....	.....
Percent. expenses of receipts	57.62	58.95	67.10	53.88	53.07	49.93	56.47

General News Section.

The intermittent pre-cooling plant built by the Southern Pacific at Roseville, Cal., was put in operation on October 9.

C. H. Turner, owner of a township in the Adirondack mountains, has sued the New York & Ottawa Railway for $410,000 for loss of timber two years ago in a fire which is alleged to have been caused by sparks from a locomotive.

The Texas Railroad Commission has agreed to exempt from its "30-minute order" the Katy Limited, the new train of the Missouri, Kansas & Texas. The 30-minute rule forbids the holding of trains more than 30 minutes at junctions for connections.

The New York Central Car Demurrage Bureau, reporting 72,127 cars for the month of September, advise the average detention by the railways was .33 day, and the average detention by the consignee was 1.7 days, making a total average detention of 2.03 days.

Charles T. Ripley, graduated last June in railway electrical engineering at the University of Illinois, has received the first prize, given by the John G. Brill Company, of Philadelphia, a memorial medal and $250, for a design for electric railway cars for city service. Mr. Ripley's graduating thesis, upon which he won the prize, was on the design of the car body.

The Attorney-General of California has given an opinion that the street railways of that state should not be required to make annual reports of their earnings to the secretary of state. The Attorney-General says that railways which are under the control of the state are so treated mainly for the purposes of regulating their services and rates, but, on this principle, the city railways would be exempt from state regulation because the municipalities have full power of control over them in these matters.

At a meeting of the chamber of commerce in Charleston, W. Va., last week, Senator Elkins told the members that they had better not expect railways, when offered plenty of traffic on their own lines, to allow their freight cars to go off on other lines. The senator doubts whether the courts would sustain the Interstate Commerce Commission in issuing an order to that effect. Both Senator Elkins and ex-Senator H. G. Davis, president of the Coal & Coke Railway, are quoted as saying they had no objection to the establishment of a state railway commission in West Virginia.

President McCrea, of the Pennsylvania, is quoted in a Chicago paper as saying that the new union passenger station, costing approximately twenty-five millions, is to be built for the roads using the present union station at Adams street; that is, the Pennsylvania Lines, the Burlington, the Alton, and the Chicago, Milwaukee & St. Paul. It is stated that the Pennsylvania Company has bought almost the entire block facing the Northwestern's new station, between Washington and Madison streets and east of Canal, and that probably the new station will be built opposite the new Northwestern station, on Madison street.

The Brussels-Aix la Chapelle Railway.

Plans for constructing the new government railway from Brussels to Aix la Chapelle (in Germany, near the Belgian boundary) are well advanced. The distance is 77 miles, air line. The location of the line from Brussels to Tongres, 46 miles, air line, has been determined, and the route on to the German frontier is being studied. This new line, it is said, will be one of the highest speed lines on the continent, and will be constructed so that electric traction can eventually be substituted. It will be most favorably located for running at high speed, as it is almost free of curves. The railway administration is trying to insure by the new line more rapid service to England, so as to reduce time between London or Liverpool and central Europe, and thus improve Belgium's position as a railway transit country for both passengers and freight.

The treaty between Germany and Belgium provides that work on the Belgian section of the international line must be completed within 10 years after the approval of the project by the Belgian parliament, and, as approval has been given, the railway department has eight years in which to complete the work. It is generally believed, however, that the line will be completed earlier.

Regarding that portion between Tongres and Germany, the Belgian government has completed plans for the section between Tongres and Welkenraedt. Thence to Herbesthal, Germany, the line is to remain as it is, the German government having agreed to reduce the 2.5 per cent. grade at Ronheide to 0.9 per cent. On the section westward from Brussels to the coast a new station will be erected at Bruges, two-thirds of a mile from the present depot, thereby doing away with the present system of leaving the main line to reach Bruges. This arrangement will enable trains to pass through Bruges at 78 miles an hour. Furthermore, as the new line being built between Denderleeuw and Ghent is arranged for electrical equipment and high speed, it is probable that trains running on the new road will make use of it.

Throughout the entire length the new road will have no grade crossings and no curve over 0.5 deg. It is said that the speed to be maintained by trains will be 94 miles, at which the country can be traversed in 2½ hours.

Test of Headlights in Indiana.

Near Avon, Ind.. on the Cleveland, Cincinnati, Chicago & St. Louis, last week, a whole night was spent in making experiments with oil and electric lights, the tests being carried out by the state railway commission, in pursuance of a law of Indiana, requiring the commission to investigate the subject and then issue an order requiring the best headlights to be put in use throughout the state. A number of engineers and railway officers accompanied the commissioners. Facing an electric light on an engine coming from the opposite direction, the observers could not see a semaphore light until they got within 2,000 ft. of it, though when facing an oil light the signal could be seen 5,000 ft. away. On a locomotive with an electric headlight moving east the classification lamps on the front of the boiler could not be seen by the observers until they approached within 400 ft., but when the engine was equipped with an oil light they saw the classification lights 700 ft. away. With an electric headlight on the observation car. the observers, looking for a hand-car on the track, were able to see it only 700 ft. away, and a coal car was not visible until they reached a point within 1,000 ft. of it. A man on the track was seen no farther than 200 ft.; but a car on a siding, not clearing the main line, was seen 870 ft. away. One of the commissioners told a reporter that the Brotherhood of Trainmen had filed with the commission a resolution asking the board not to prescribe electric headlights, as the use of these lights made the work of the trainmen more difficult.

Bion J. Arnold on Electrification of Steam Roads in Chicago.

Bion J. Arnold, of the Arnold Company, Chicago, quoted in the Chicago *Evening Post*, says that at least three of the railways entering Chicago could electrify their terminals in that city with advantage to the city and to themselves. The transition from steam to electricity could be made in three years, but five years would allow a better opportunity to make the change successfully. The cost would necessarily be large, but wherever a study of conditions will show that the resulting economy will bring a fair return on the investment electrical operation should be inaugurated for the good of Chicago. He said he spoke without prejudice to any interest since he had

not had occasion to make a detailed study of local conditions. To enforce arbitrary ordinance requirements against all railways centering in the city would be to require the impossible. Continuing Mr. Arnold said:

"It is an engineering fact, now well established, that our great railway terminals, where traffic is constant, switch engines are shunting back and forth and suburban trains run at frequent intervals, can be operated more economically by electricity than by steam.

"On the lines of the Illinois Central conditions apparently exist which are most favorable to this change. To install electrical equipment you incur large fixed charges, but with constant use a large economy is effected. Heavy freight trains running at long intervals provide a poor field for electrification.

"The experience of eastern roads in the abandonment of the steam locomotive has demonstrated the possibility of economy, but it has not as yet been fully realized. The maximum use is not now being obtained on the New York Central or on the New York, New Haven & Hartford. When it is, the full economy will become apparent."

Chicago Subway.

Following a conference of stockholders and others interested in this company, held in New York last week, it was announced that satisfactory arrangements had been agreed upon to settle temporarily the company's financial difficulties. Up to last July the traffic receipts of the tunnel lines were small, but since then the net earnings have amounted to more than one-half of the fixed charges. The number of cars moved daily was about 3,500. It was announced that the tunnel leading to the lake docks would be opened this week.

Abandonment of Farnham Shops.

According to a statement in the *Montreal Herald*, presented as having been confirmed by officers of the road, the Canadian Pacific has decided to close its shops at Farnham, P. Q., and to have the work heretofore done there transferred to the Angus shops at Montreal. It is said that the Farnham shops have employed 400 men.

Welland Canal.

The Canadian government engineers have reported a tentative route for a new Welland Canal large enough to provide for successful competition with the Erie barge canal. The new line is from Port Colborne to Fifteen Mile Creek, emptying into Lake Ontario there instead of at Port Dalhousie. This canal will have seven locks, instead of the twenty-five which now make the canal expensive and slow. The new canal may be built in five years. It will be seven miles shorter than the present route. The government will be asked to pass legislation at the coming session to provide for the building of the canal.

American Society of Civil Engineers.

At the meeting held on October 20, a paper by Chester W. Larner, Esq., entitled Characteristics of Modern Hydraulic Turbines, was presented for discussion and illustrated with lantern slides. This paper was printed in the August number of *Proceedings*.

American Association of Traveling Passenger Agents.

The following officers for the ensuing year were elected at the meeting of this association in Chicago last week: President, George W. Andrews, Pacific Coast Steamship Co., Seattle, Wash.; vice-president, Charles W. Humphrey, Chicago & Eastern Illinois, St. Paul, Minn.; secretary, Gordon G. Noble, Lehigh Valley, Philadelphia, Pa. The members of the executive committee were re-elected.

On the evening of October 13 the association gave a dinner to the general passenger agents at the La Salle hotel. M. H. Bohreer (M. & O.), president of the association, introduced A. B. Calder, general agent of the passenger department of the Canadian Pacific at Seattle, Wash., who was toastmaster. Warren J. Lynch, passenger traffic manager of the New York Central Lines, made a brief talk in which he dwelt on the importance of the work of the traveling passenger agent, and Wilbur D. Nesbit, of the *Chicago Evening Post*, entertained the diners with a witty monologue interspersed with readings of his own poems. The next meeting of the association will be held in Dallas, Tex., on dates to be fixed by the executive committee.

Railway Storekeepers' Association.

The seventh annual convention will be held at St. Louis, Mo., on May 16, 17 and 18, 1910. Headquarters will be at the Planters' hotel. J. P. Murphy, secretary-treasurer, Box C, Collinwood, Ohio.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

Air Brake Association.—F. M. Nellis, 53 State St., Boston, Mass.
American Association of Demurrage Officers.—A. G. Thomason, Scranton, Pa. June, 1910; Niagara Falls, Ont.
American Assoc. of Local Freight Agents' Ass'ns.—G. W. Dennison, Penna. Co., Toledo, Ohio.
American Institute of Electrical Engineers.—R. W. Pope, 33 West 39th St., New York; second Friday in month; New York.
American Railway Association.—W. F. Allen, 24 Park Place, New York; Nov. 17; Chicago.
American Railway Bridge and Building Association.—S. F. Patterson, B. & M., Concord, N. H.
American Railway Engineering and Maint. of Way Assoc.—E. H. Fritch, Monadnock Bldg., Chicago. March 14-17, 1910; Chicago.
American Railway Industrial Association.—G. L. Stewart, St. L. S. W. Ry., St. Louis; second Tuesday, May; Memphis, Tenn.
American Railway Master Mechanics' Association.—J. W. Taylor, Old Colony Building, Chicago.
American Society for Testing Materials.—Prof. Edgar Marburg, Univ. of Pa., Philadelphia.
American Society of Civil Engineers.—C. W. Hunt, 220 W. 57th St., N. Y.; 1st and 3d Wed., except July and August; New York.
American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., N. Y.; 2d Tues. in month; annual, Dec. 7-10; New York.
American Street and Interurban Railway Association.—B. V. Swenson, 29 W. 39th St., New York.
Association of Am. Ry. Accounting Officers.—C. G. Phillips, 143 Dearborn St., Chicago; June 29, 1910; Colorado Springs.
Association of Railway Claim Agents.—E. H. Hemus, A., T. & S. F., Topeka, Kan.; May; Nashville, Tenn.
Association of Railway Telegraph Superintendents.—P. W. Drew, Wisconsin Central Ry., Chicago. May 16-20, 1910; Los Angeles.
Association of Transportation and Car Accounting Officers.—G. P. Conard, 24 Park Place, N. Y. Dec. 14-15; Chattanooga.
Canadian Railway Club.—James Powell, Grand Trunk Ry., Montreal, Que.; 1st Tues. in month, except June, July and Aug.; Montreal.
Canadian Society of Civil Engineers.—Clement H. McLeod, Montreal, Que.; irregular, usually weekly; Montreal.
Central Railway Club.—H. D. Vought, 95 Liberty St., New York; 2d Friday in January, March, May, Sept. and Nov.; Buffalo.
Freight Claim Association.—Warren P. Taylor, Rich., Fred. & Pot. R. R., Richmond, Va. June 15, 1910, California.
International Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York.
International Railway Fuel Association.—D. B. Sebastian, La Salle St. Station, Chicago.
International Railway General Foremen's Association.—L. H. Bryan, D. & I. R. Ry., Two Harbors, Minn.; May; Cincinnati.
Iowa Railway Club.—W. B. Harrison, Union Station, Des Moines, Ia.; 2d Friday in month, except July and August; Des Moines.
Master Car Builders' Association.—J. W. Taylor, Old Colony Bldg., Chicago.
New England Railroad Club.—G. H. Frazier, 10 Oliver St., Boston, Mass.; 2d Tues. in month, ex. June, July, Aug. and Sept.; Boston.
New York Railroad Club.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August; New York.
North-West Railway Club.—T. W. Flanagan, Soo Line, Minn.; 1st Tues. after 2d Mon., ex. June, July, August; St. Paul and Minn.
Railway Club of Pittsburgh.—J. D. Conway, Pittsburgh, Pa.; 4th Friday in month, except June, July and August; Pittsburgh.
Railway Signal Association.—C. C. Rosenberg, 12 North Linden St., Bethlehem, Pa.
Railway Storekeepers' Association.—J. P. Murphy, Box C, Collinwood, Ohio; May 16-18; St. Louis
Roadmasters' and Maintenance of Way Association.—Walter E. Emery, P. & P. U. Ry., Peoria, Ill.
St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug.; St. Louis.
Society of Railway Financial Officers.—C. Norquist, Chicago.
Southern Association of Car Service Officers.—J. H. O'Donnell, Bogalusa, La.
Southern and Southwestern Ry. Club.—A. J. Merrill, Prudential Bldg., Atlanta; 3d Thurs., Jan., April, Aug. and Nov.; Atlanta.
Traveling Engineers' Association.—W. O. Thompson, N. Y. C. & H. R. R., East Buffalo, N. Y.
Western Canada Railway Club.—W. H. Rosevear, 199 Chestnut St., Winnipeg; 2d Mon., ex. June, July and Aug.; Winnipeg.
Western Railway Club.—J. W. Taylor, Old Colony Bldg., Chicago; 3d Tuesday each month, except June, July and August; Chicago.
Western Society of Engineers.—J. H. Warder, Monadnock Bldg., Chicago; 1st Wednesday, except July and August; Chicago.

Traffic News.

The number of loaded freight cars passing Altoona on the Pennsylvania Railroad in the month of September was 84,797, an increase of 416 over the same month two years ago, which was the heaviest month up to that time.

A. H. Hanson, passenger traffic manager of the Illinois Central, completed 40 years' service with this road on October 13. On that date a luncheon was given in his honor at the Chicago Athletic Club, at which a large number of the passenger officers and passenger representatives of the road were present. Mr. Hanson was in the freight, claim and operating departments before he entered the passenger service in 1877 as assistant general passenger agent.

Informal complaint has been made to the Attorney-General of Ohio and the Department of Justice at Washington calling attention to the large fright bills owed by the Sunday Creek Coal Company to the Hocking Valley Railway. It is charged that allowing one shipper unlimited credit and to run freight bills into millions, while requiring other shippers to pay cash, is an unjust discrimination. It is understood that the independent coal operators of Ohio are back of the complaint.

According to a press despatch from San Francisco there is regret in that city because the American transcontinental railways do not get the profit on the 100 carloads of cheese which come to that city from the East yearly; but it appears that the Canadian Pacific, which brings the cheese, receives on it only $1.09 per 100 lbs. through from Antwerp, Belgium, to Vancouver. The rate from Vancouver to San Francisco by steamer is 25 cents. It is said that the tariffs of the American transcontinental lines name a rate of $2 per 100 lbs. from New York and $3 from Antwerp.

The Illinois railway commission will hold a hearing in Chicago, October 4, to determine the reasonableness of the rates charged by the express companies doing business in the state. On July 6 the commission passed resolutions stating that it had received many complaints of exorbitant express rates, calling attention to the fact that the attorney-general had held that it could fix maximum reasonable express rates and requiring the companies to file with it their schedules of rates. Several companies have filed their schedules but all deny the jurisdiction of the commission.

The traffic department of the Northern Pacific has announced that on Oct. 31 its transcontinental service will be increased to five daily electric-lighted trains in each direction, to and from north Pacific coast points. After that date the North Coast Limited will be an all-sleeping-car train, first class in both directions. A new train will run through solid between Chicago and Seattle-Portland. Another new train will be run between St. Paul-Minneapolis and Tacoma-Seattle. This train will have a through sleeping car daily between Duluth and Seattle. The through train between St. Louis, Kansas City and Puget Sound will continue to be run as an electric-lighted fast train. The running time between Chicago and the coast will be placed on a 72-hour schedule each way.

Receipts of grain at New York for the month of September are reported as follows (bushels):

	1909.	1908.
New York Central	1,399,467	1,330,748
West Shore	1,272,800	1,600,617
Erie	1,385,308	1,727,226
Pennsylvania	768,067	873,142
Del., Lack. & Western	611,772	566,245
Lehigh Valley	1,899,795	2,409,659
Baltimore & Ohio	153,397	169,282
Various	83,401	43,080
Total rail	7,574,007	8,719,999
Total water	1,138,225	506,894
Total rail and water	8,712,232	9,226,843

Receipts at the four north Atlantic ports were 17,421,651 bu., of which 5,624,151 bu. were for export. The distribution was as follows:

	Receipts.	Exports.
New York	8,712,232	2,577,466
Philadelphia	3,528,168	1,578,193
Baltimore	3,151,477	847,359
Boston	2,029,744	621,133
Total	17,421,651	5,624,151

Hearings in Seattle and Portland Rate Cases.

The Interstate Commerce Commission took testimony last week at Seattle and Portland in the proceedings which the business men at these points and Tacoma have brought to secure reductions in the freight rates from the Pacific coast inland.

James S. Goldsmith, first vice-president of Schwabacher Brothers & Company, of Seattle, said in his testimony at Seattle that under a fair readjustment of rates the jobbers of Seattle should be able to distribute goods as far east as the jobbers of cities in the middle states come west. From time to time during the last ten years the territory of the Seattle jobbers, he said, has been narrowed by reductions in westbound rates. It would require a reduction of 25 per cent. to points which are reached by the middle western shippers and a much larger percentage of reduction to points farther west to enable the Seattle jobbers to hold the business to which they think they are entitled. He said that about 65 or 70 per cent. of the goods his concern sells are manufactured or produced on the coast. The principal articles in his firm's line originating on the coast are canned goods, beans, condensed milk, cereals and sugar. Ten years ago about 30 per cent. of the products which his concern jobbed originated on the coast.

Chairman Knapp asked whether, if the rates were reduced, Schwabacher Brothers & Company would expect to get into Spokane territory. Mr. Goldsmith replied that it would, and still farther east. Commissioner Clark asked where the jobber situated between Seattle and St. Paul would get in. The witness replied that this was answered by the fact that there are already a good many jobbers at Spokane and that the carload buyer always has an advantage over the man who ships in less than carload lots.

J. N. Teal, counsel for the coast shippers, read into the records the findings of fact made by the Washington Railway Commission in its valuation of railways. The Washington commission valued the entire property of the Northern Pacific in the state at $111,344,950 and allotted $65,000,000 of this to interstate business and $45,000,000 to state business. According to the figures presented by Mr. Teal the state earnings of the Northern Pacific in 1905 were 11.7 per cent. of the total; in 1906, 13.17 per cent.; in 1907, 13.06 per cent., and in 1908, 18.5 per cent.

W. A. Mears, manager of the traffic bureau of the Seattle Chamber of Commerce, submitted tables comparing the coast distributive rates with those out of St. Paul and Minneapolis on the northern lines, out of Winnipeg on the Canadian Pacific, out of Omaha on the Burlington and out of Kansas City on the Rock Island and the St. Louis & San Francisco. The tendency of rate-making during the last 10 years, he said, has been to reduce the westbound rates from the Missouri river while the coast distributive rates have stayed unchanged. This has restricted the territory of the coast cities until their manufacturers are unable to get out of Washington with their goods and most of them cannot get much east of the mountains. Commissioner Prouty asked in what territory it is claimed that the shippers on the Missouri river have an advantage over those at the coast. Mr. Mears said that they have an advantage 500 miles east of the coast, that the general average of eastbound rates to a score of places on second, third and fourth class merchandise is 113 per cent. higher in Washington than the rates westbound from St. Paul and that the general average of rates on the same classes eastbound to points at the middle of the Northern Pacific is 92 per cent. higher than the westbound rates from St. Paul to the same points.

J. L. Carman, a manufacturer of mattresses, spring beds and iron beds at Tacoma, testified that the rates on manufactured products to the west had steadily decreased, while the rates on raw materials that were necessary for the coast manufacturers had increased. The testimony of numerous jobbers was introduced to show that the rates from the coast inland are excessive compared with the rates from the Missouri river. S. A. Nourse, manager of a wholesale grocery company at Tacoma and chairman of the Tacoma Traffic Association, said that his concern does a fair trade as far east as Walla Walla, Wash., but that the westbound rates make it possible for jobbers on the Missouri river to keep him out of Idaho and Mon-

tana. He says he has given up trying to get into the Spokane field. George Boole, a hardware jobber, said that not more than 5 per cent. of his total business is done east of the Cascade mountains. E. F. Baxter, manager of the Pacific Coast Syrup Company, said that the Corn Products Company is able to drive him out of the market in Montana, Idaho and eastern Washington because it ships on low westbound rates. F. G. Frink, of the Washington Iron Works, testified that the American Bridge Company is able to ship fabricated steel to western points on practically the same rates as those on raw material, and that as his concern has to get 75 per cent. of its raw material from the east it is hard to meet the competition.

J. G. Woodworth, traffic manager of the Northern Pacific, and W. P. Kenney, assistant traffic manager of the Great Northern, testified for the railways. Mr. Woodworth's testimony tended to refute the evidence of the complainants that no substantial reduction in eastbound rates has been made during the past 10 years. He produced tariffs which showed that the rates of the Northern Pacific have been reduced an average of 13.5 per cent. in 10 years. The reductions have been as follows: In Washington, 10.2 per cent.; in Idaho, 12.2 per cent.; in Montana, 18.1 per cent. The Spokane distributive rates, he said, were first made by the Northern Pacific to enable Spokane jobbers to compete with the jobbers at Portland. The rates may appear to be a discrimination in favor of Spokane, but every time the question of their reasonableness has been raised the conclusion has been reached that they are not unjust. When they came before the Washington Commission the Northern Pacific contended that if they were to be taken as a measure of its other rates they would have to be canceled. The Northern Pacific now proposes to reduce the class rates from the coast to Spokane 16⅔ per cent. It proposes to make the same percentage of reduction from the east to Spokane. As the proposed westbound rate to Spokane would be determined by taking 75 per cent. of the coast terminal rate and adding the local rate from the coast back to that city, the readjustment proposed would result in giving Spokane a rate proportionately considerably lower. The proposed reduction will result in a loss of revenue to the railway of approximately $388,000. As a result of the reduction in the class rates from the east ordered by the commission, there will be a shrinkage of revenues of $140,000. The shrinkage in the earnings on eastbound traffic will be about $248,000, making a total of $388,000 a year. These figures are based on the estimated traffic for 12 months. There might also be expected a shrinkage in the earnings of the Northern Pacific as a result of the competition of the Chicago, Milmaukee & Puget Sound, the extension of the Union Pacific to Puget Sound, and the extension of the Great Northern over the Northern Pacific lines to Portland. The North Coast line is under construction and its completion will further reduce the Northern Pacific's earnings. The order of the Washington state railway commission reducing grain rates will result in a reduction of $300,000 a year. There are also two important sources of revenue that are lost. Those are the earnings from handling material for the construction of the Milwaukee and the North Bank roads. For the last three years the Northern Pacific's earnings from the Milwaukee business have been as follows: In 1907, $132,612; 1908, $783,346; 1909, $795,765, making a total of $1,711,723. During the same period it received from the North Bank road a total of $1,576,532.

Mr. Woodworth said that in view of the loss of earnings which his company must sustain he believed that the reduction of 16⅔ per cent. was liberal.

A number of manufacturers and shippers at Portland gave testimony to show that the distributive rates from Portland to the East are much less favorable to that city than similar rates made at other cities. Manufacturers of various articles tried to show that the railways are making low rates from the East to the coast on finished articles made by middle western manufacturers, while they are making high rates to the coast on raw materials, and that at the same time they are making high rates from the coast back on finished products, the result of this scheme of rate-making being, according to the witnesses, that they are prevented from meeting the competition of middle western manufacturers except in a very circumscribed territory lying directly along the coast.

J. C. Luckell, president of the Luckell, King & Cake Soap Company, said that his concern has to pay 90 cents per 100 lbs. on cottonseed oil from Kansas City and other points in the Middle West, while soap made from this oil can be shipped from the Middle West to the coast at 80 cents per 100 lbs. He intimated that some influence is at work which gives the packing concerns in the Middle West control of the soap business throughout the West except immediately adjacent to the Pacific coast.

J. N. Teal, counsel for the Portland shippers, introduced a table giving distributive rates per ton per mile out of Portland and also out of a number of middle western cities. According to this table some of these rates average as follows: Oregon Railroad & Navigation Company, between Portland and Biggs, 108 miles, 6.14 mills per ton per mile; other roads for similar distances, Union Pacific westward from Omaha, 6.15 mills; Great Northern out of Minneapolis, 4.25 mills; Canadian Pacific out of Winnipeg, 6.13 mills; Northern Pacific out of St. Paul, 4.33 mills; Oregon Railroad & Navigation Company, Portland to Umatilla, 187 miles, 7.18 mills per ton per mile; roads out of Omaha, a like distance, Union Pacific, 5.11 mills; Chicago & North Western, 4.99 mills.

W. W. Cotton, general attorney of the Oregon Railroad & Navigation Company, with a view to showing that the profits of this road, which are complained of as excessive, are not so large as those of many of the complaining jobbers, asked L. A. Lewis, of the jobbing house of Allen & Lewis, Portland, what was the average profit of business concerns in the Portland district, and he replied that so far as his knowledge went he thought the average is about 20 per cent. Mr. Cotton announced that he would attempt to show that the profits of the Oregon Railroad & Navigation Company per year have not been more than 7 per cent. Herman Wittenberg, president of the Pacific Coast Biscuit Company, and chairman of the Transportation Committee of the Portland Chamber of Commerce, said that his company is satisfied with the rates which are given it, but that he wished to enter an emphatic protest against the rates given the National Biscuit Company on its shipments to the Pacific coast and the Middle West, which, he said, are about one-half of the rates given the Pacific coast manufacturers on shipments eastward. J. R. Bowles stated that the railways are making to the Pacific coast the same rate on raw materials entering into the manufacture of steel as they are making on the finished products, despite the difference in value and space occupied. Complaint was made, he said, to the traffic managers of the railways, and they said that if the United States Steel Corporation would consent to a change in the rates it would be made. Pacific coast men, the witness continued, applied to the steel corporation for approval of the proposed change, but it was not approved and has never been made.

W. W. Cotton testified for the Oregon Railroad & Navigation Company regarding the capitalization and earnings of this road. He stated that in 1908 the company had paid a dividend of 79 per cent., and again in 1909 had paid a dividend of 12½ per cent., but he pointed out that these dividends were simply the disposition of a surplus which had accumulated during a long period of years, during which no dividends at all had been paid. He referred to the fact that the Oregon Short Line long ago bought $14,000,000 of Oregon Railroad & Navigation Company stock. He had made a careful computation of the average annual returns which the Oregon Short Line had got on this stock, and it amounted to just 6 per cent. He considered this one of the poorest investments that had ever been made in the Northwest.

Exports of Grain from Canada.

The following statement from a consular report shows the quantities of wheat, oats and barley exported from Canada during the harvest years of 1900, 1905 and 1908:

	Bushels		
	1900.	1905.	1908.
Wheat	9,359,640	41,905,937	45,879,098
Oats	8,106,680	3,869,302	4,829,025
Barley	2,412,972	982,738	2,702,154

Exports of last year's harvest included also 10,000,000 bushels of wheat in the shape of flour, making the total for the year about 56,000,000 bushels, or about 18,000,000 bushels less than the total quantity of wheat inspected for sale in the three prairie provinces.

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF AUGUST, 1909.
(See also issues of October 8 and 15.)

Name of road.	Mileage operated at end of period.	Operating revenues			Operating expenses						Net operating revenues (or deficit).	Outside operations. net.	Taxes.	Operating income (or loss).	Increase (or dec.) comp. with last year.
		Freight.	Passenger.	Total, inc. misc.	Maintenance: Way and structures.	Maintenance: Of equipment.	Traffic.	Transportation.	General.	Total.					
Alabama & Vicksburg	143	$78,037	$40,764	$127,425	$22,772	$22,486	$3,520	$40,347	$5,036	$94,161	$33,264	.....	$4,000	$29,264	$13,933
Alabama Great Southern	309	177,560	100,242	305,425	25,213	95,045	8,264	86,054	7,743	222,318	83,107	—$673	11,236	71,198	—2,954
Ann Arbor	301	86,393	57,732	154,850	26,785	11,669	4,460	50,996	3,969	97,879	56,971	4,334	12,330	48,975	—1,915
Bessemer & Lake Erie	201	837,119	48,762	893,970	63,913	116,556	7,096	179,177	6,112	372,854	521,116	.....	5,000	516,116	125,073
Buffalo & Susquehanna	561	192,160	25,945	224,787	38,663	53,205	1,754	71,976	7,237	172,835	51,952	.....	4,000	47,952	12,506
Central Vermont	411	190,255	129,517	341,790	38,914	42,413	8,023	124,934	6,135	220,419	121,371	1,829	10,117	113,083	28,017
Chicago & Alton	998	766,322	412,334	1,265,060	153,858	115,277	40,466	329,051	27,324	665,976	599,084	—692	32,000	566,392	36,590
Chicago, Indiana & Southern	340	233,652	29,024	268,811	55,816	49,599	9,588	88,708	8,070	211,781	57,030	169	12,500	44,699	1,921
Cincinnati, Hamilton & Dayton	1,036	549,826	187,444	820,449	131,110	138,157	21,803	295,791	58,279	645,140	175,309	.....	25,833	149,476	—25,826
Cincinnati, New Orleans & Texas Pac	337	491,888	137,899	661,114	65,921	150,387	19,506	172,693	18,239	426,746	234,368	—495	20,000	213,873	17,275
Cincinnati Northern	248	82,751	30,986	118,837	18,472	16,346	3,313	33,590	2,424	74,145	44,692	.....	4,100	40,592	3,817
Colorado Midland	337	122,143	50,906	192,118	29,521	34,556	9,907	83,124	5,742	162,850	29,268	821	9,350	20,739	—25,814
Detroit, Grand Haven & Milwaukee	191	90,298	66,544	176,337	30,586	27,725	5,919	60,779	3,164	128,173	48,164	104	2,727	45,541	5,526
Detroit, Toledo & Ironton	441	114,387	16,687	140,718	26,652	16,988	2,979	58,542	4,295	109,456	31,262	.....	6,510	24,752	—10,869
Georgia Southern & Florida	395	87,509	62,024	170,726	20,442	33,449	5,196	60,655	7,673	127,415	43,311	1,769	8,066	37,014	—8,545
Grand Trunk Western	336	306,655	194,379	536,365	61,617	69,996	24,180	175,532	9,763	341,088	195,277	410	29,190	166,497	—25,665
Hocking Valley	350	531,995	94,061	644,181	71,593	127,431	7,318	161,529	10,864	378,735	265,446	20,255	21,441	264,260	31,887
Houston & Texas Central	789	321,662	130,583	482,383	57,251	48,895	17,027	171,057	18,585	312,815	169,568	.....	19,632	149,936	46,040
Iowa Central	558	199,534	58,240	270,859	33,762	45,215	9,802	102,504	9,090	200,373	70,486	.....	7,411	63,075	—15,350
Kanawha & Michigan	175	205,347	28,892	238,213	45,151	43,698	2,762	55,201	3,908	150,720	87,493	—11	6,929	80,553	34,076
Minneapolis & St. Louis	1,027	227,756	120,629	375,729	34,675	40,867	12,492	135,867	11,543	235,444	140,285	—442	18,117	121,756	4,535
Morgan's La. & Tex. R.R. & S.S. Co.	358	220,342	88,137	325,502	51,668	47,276	10,969	123,394	12,593	245,900	79,602	1,532	16,000	65,134	13,980
New Orleans & North Eastern	196	188,735	53,558	258,706	25,334	45,212	8,145	92,586	9,467	180,744	77,962	.....	8,000	69,962	21,353
Norfolk & Southern	582	117,474	71,821	207,429	24,568	22,452	4,642	63,211	13,863	128,736	78,693	—1,394	5,900	71,399	29,718
Northwestern Pacific	375	131,458	181,514	334,149	67,366	33,741	3,224	99,632	9,571	213,534	120,615	.....	10,581	110,034	—5,560
Peoria & Eastern	351	202,373	70,644	291,253	33,352	36,158	5,484	93,593	4,971	173,558	117,695	.....	8,800	108,895	41,951
Pittsburgh & Lake Erie	191	1,285,972	147,416	1,469,846	141,210	138,511	12,570	283,221	20,404	595,916	873,930	—277	17,000	856,653	218,413
Rutland	468	144,837	125,981	300,624	43,796	32,113	6,564	87,707	5,141	175,321	125,303	.....	9,895	115,408	27,716
San Antonio & Aransas Pass	727	203,005	97,280	318,267	40,501	42,981	4,655	121,503	8,284	217,924	100,343	.....	9,000	91,343	—52,751
Tennessee Central	292	86,166	39,355	131,523	15,360	16,382	3,933	42,250	7,615	85,540	45,983	.....	4,199	41,784	6,990
Toledo & Ohio Central	441	304,714	71,226	394,488	55,957	59,196	6,586	107,703	6,040	235,482	159,006	11,505	13,845	156,666	—2,381
Toledo, St. Louis & Western	451	265,553	58,263	343,024	37,648	50,518	6,758	98,297	7,712	200,933	142,091	.....	12,000	130,091	18,599
Vicksburg, Shreveport & Pacific	171	59,928	39,852	107,608	14,758	19,423	3,405	33,300	4,121	75,007	32,601	.....	6,200	26,401	3,421
Virginian	444*	121,128	19,125	148,289	25,869	22,909	6,631	40,152	7,806	103,367	44,922	592	10,000	35,514	36,774
Wabash	2,515	1,659,889	779,106	2,624,167	291,424	348,471	73,115	868,023	61,196	1,642,229	981,938	1,281	64,495	918,724	74,806
Wheeling & Lake Erie	442	500,721	64,465	615,263	74,826	152,906	7,073	182,697	14,910	432,412	182,851	4,242	23,152	163,941	35,136
TWO MONTHS OF FISCAL YEAR 1910.															
Alabama & Vicksburg	143	$149,628	$79,458	$246,088	$46,590	$38,043	$7,083	$79,225	$10,085	$181,026	$65,062	.....	$8,000	$57,062	$24,556
Alabama Great Southern	309	340,281	192,063	585,300	52,918	170,028	16,554	172,844	18,505	430,849	154,451	—$988	22,472	130,991	—11,747
Ann Arbor	301	167,923	107,767	296,215	50,003	23,200	9,036	103,118	8,754	194,111	102,104	8,755	24,661	86,198	14,366
Bessemer & Lake Erie	201	1,684,782	83,981	1,783,619	131,458	227,674	14,314	362,087	13,253	748,786	1,034,833	.....	10,000	1,024,833	300,618
Buffalo & Susquehanna	361	361,574	51,980	426,793	76,594	99,815	3,728	141,532	14,897	336,566	90,227	83	8,000	82,310	14,826
Central Vermont	411	383,591	241,369	341,790	38,914	42,413	8,023	124,934	6,135	220,419	121,371	1,829	10,117	113,083	75,762
Chicago & Alton	998	1,390,659	781,807	2,354,748	299,836	239,526	81,750	685,593	57,364	1,364,069	990,679	—1,004	64,000	925,675	—87,758
Chicago, Indiana & Southern	340	470,682	53,466	537,040	111,835	98,283	19,183	176,817	15,304	421,422	115,618	444	25,000	91,062	53,492
Cincinnati, Hamilton & Dayton	1,036	1,063,507	353,088	1,575,499	256,847	275,513	42,199	582,249	79,072	1,235,880	339,619	.....	51,666	287,953	11,889
Cincinnati, New Orleans & Texas Pac	337	993,933	262,659	1,323,127	123,631	283,067	37,709	369,670	35,654	849,731	473,396	286	40,000	433,682	50,339
Cincinnati Northern	248	142,313	54,495	207,168	35,303	35,162	6,040	61,056	4,722	142,283	64,885	.....	8,200	56,685	2,135
Colorado Midland	337	244,438	95,369	392,190	58,616	68,783	19,954	159,627	11,092	318,072	74,118	1,299	18,700	56,717	—40,904
Detroit, Grand Haven & Milwaukee	191	179,466	125,962	345,078	57,936	46,740	11,908	122,904	22,276	261,764	83,314	183	5,454	78,043	6,316
Detroit, Toledo & Ironton	441	205,567	31,233	254,507	49,877	27,574	6,550	113,824	8,233	206,058	48,449	—19	13,021	35,409	2,876
Georgia Southern & Florida	395	180,811	119,753	340,228	37,911	64,523	10,367	128,395	15,735	256,931	83,297	3,416	16,132	70,581	—130
Grand Trunk Western	336	577,490	375,833	1,018,240	111,056	136,367	51,340	343,251	33,559	675,573	342,667	416	58,380	284,703	39,649
Hocking Valley	350	963,843	173,611	1,175,446	140,376	225,330	15,270	304,543	23,097	708,616	466,830	43,120	41,754	468,196	32,291
Houston & Texas Central	789	623,546	262,608	946,568	115,431	100,303	33,497	348,446	37,760	635,437	311,131	.....	39,263	271,868	79,710
Iowa Central	558	388,318	109,462	523,598	69,043	90,875	19,099	217,794	17,736	414,547	109,051	.....	14,814	94,237	—32,354
Kanawha & Michigan	175	386,478	57,467	452,207	85,447	82,026	3,955	105,358	7,926	284,712	167,495	—65	13,771	153,658	48,988
Minneapolis & St. Louis	1,027	453,582	236,892	742,489	75,999	81,631	22,841	256,994	24,923	462,388	280,101	—477	36,019	243,605	35,125
Morgan's La. & Tex. R.R. & S.S. Co.	358	425,015	179,538	639,932	94,608	104,250	20,081	246,312	25,099	490,350	149,582	3,048	32,000	120,630	16,237
New Orleans & North Eastern	196	360,138	101,901	494,921	51,501	81,430	17,217	178,767	18,832	347,747	147,174	.....	15,600	131,574	29,221
Norfolk & Southern	582	240,513	142,754	423,897	52,562	46,286	10,431	128,764	27,825	265,868	158,029	1,055	11,800	147,284	79,128
Northwestern Pacific	375	243,067	399,110	683,684	113,792	66,573	5,653	199,086	19,350	404,454	279,230	.....	21,162	258,068	17,381
Peoria & Eastern	351	366,981	126,771	531,047	66,455	71,634	11,393	178,716	9,775	337,973	193,074	.....	17,600	175,474	52,343
Pittsburgh & Lake Erie	191	2,565,420	285,341	2,919,325	273,018	265,780	29,473	546,379	40,509	1,155,159	1,764,166	—445	34,000	1,729,721	571,447
Rutland	468	280,296	243,377	581,131	90,866	68,621	12,989	179,602	10,270	362,348	218,783	.....	19,753	199,030	47,372
San Antonio & Aransas Pass	727	365,261	191,056	591,163	83,403	84,554	9,073	233,764	17,146	427,941	163,222	.....	18,000	145,222	—58,318
Tennessee Central	292	170,186	71,836	254,534	32,253	28,484	7,506	79,838	17,043	165,124	89,410	.....	8,399	81,011	12,934
Toledo & Ohio Central	441	566,720	125,973	722,861	109,019	117,133	11,096	212,212	11,317	460,777	262,084	17,982	27,028	253,038	—90,166
Toledo, St. Louis & Western	451	509,927	98,001	647,227	74,906	95,645	13,620	193,871	15,771	393,813	253,414	.....	24,000	229,414	24,418
Vicksburg, Shreveport & Pacific	171	116,879	78,884	211,322	30,294	40,017	6,440	65,854	8,247	150,852	60,470	.....	12,400	48,070	1,670
Virginian	444*	224,002	37,552	276,618	49,961	54,502	11,001	77,422	14,345	207,231	69,387	1,145	18,000	52,532	54,863
Wabash	2,515	3,090,173	1,425,748	4,862,533	602,291	646,110	153,736	1,689,619	125,987	3,217,743	1,644,790	60	128,990	1,515,860	106,982
Wheeling & Lake Erie	442	992,665	120,574	1,205,829	150,298	273,085	15,101	354,872	30,508	823,864	381,965	10,399	46,058	346,306	43,831

*Mileage operated on Aug. 31, 1908, 204. — Indicates Deficits, Losses and Decreases.

Revenues and Expenses of Railways.

The following table gives a summary of the monthly reports of revenues and expenses of railways as filed with the Interstate Commerce Commission:

Item.	1908 Amount.	1908 Per Mile of line.	1908 Ratio p. ct.	1909 Amount.	1909 Per Mile of line.	1909 Ratio p. ct.
Rail operations:						
Freight revenue	$121,510,644	$528	66	$141,032,756	$602	67
Passenger revenue.	45,990,328	200	25	50,878,549	217	24
Other transp. rev..	14,450,843	63	8	16,297,755	70	8
Nontransp. rev....	2,016,590	9	1	2,134,486	9	1
Unclassified rev. ..	15,424	..	..	13,680	..	..
Total oper. revs.	$183,983,829	$800	100	$210,357,226	$899	100
Maint. way & struc.	$29,060,682	$126	16	$29,722,768	$127	14
Maint. of equipm't.	21,404,317	93	12	28,586,182	122	14
Transp. expenses...	64,493,792	280	35	67,359,343	288	32
General expenses..	5,253,424	23	3	5,840,248	25	3
Unclassified exp....	50,847	..	..	13,561	..	..
Total oper. exp.	$124,290,071	$540	68	$136,167,923	$582	65
Net oper. rev...	$59,693,757	$259	32	$74,189,303	$317	35
Outside operations:						
Total revenues ...	$3,249,559	$14	..	$5,086,055	$22	..
Total expenses	2,687,964	12	..	4,602,346	20	..
Net revenue	$561,605	$2	..	$483,709	$2	..
Total net rev...	$60,255,363	$262	..	$74,673,012	$319	..
Taxes (1/2 an'l amt.).	7,604,535	33	..	7,737,825	33	..
Operating income..	$52,650,828	$229	..	$66,935,187	$286	..

NOTE.—These returns are compiled from 893 reports, covering mileage aperated June 30, 1909, of 234,050.99, compared with 851 reports, covering mileage operated June 30, 1908, of 230,113.07. Analysis of these mileage returns shows that: 641 roads, covering 74,691.37 miles, operated the same mileage in June, 1909, as in June, 1908; 148 roads, operating 101,574.45 miles in June, 1908, increased their aggregate mileage to 104,698.68 miles in June, 1909; while 57 roads, operating 51,756.01 miles in June, 1908, operated only 50,785.86 miles in June, 1909. The June, 1909, statement further includes 43 roads, operating 1,515.58 miles, that did not report for June, 1908, and 4 roads, operating 2,359.50 miles in June, 1909, which replace, through various corporate changes, during the intervening period, 5 roads, operating 2,091.24 miles in June, 1908.

The T. P. A.

Show me the railway which has an efficient force of traveling passengers and I will show you a railway which has no need of president or vice-president. The reputation of the traveling passenger agent is the reputation of the railway, and the railway with a powerful force of traveling passenger agents is a great railway.—*Warren J. Lynch, N. Y. C.*

Hearing in Spokane Rate Case.

That the Interstate Commerce Commission does not intend to decide the various cases that have been brought by western intermountain points for reductions in rates with a view merely to the interests of the complaining jobbers was plainly stated by Commissioner Prouty in the course of the hearing at Spokane. Counsel for the complainants and railways were wrangling over the effect that the new rates would have on Spokane jobbing business, when Mr. Prouty interrupted them to say:

"Don't spend too much time on this subject, gentlemen, as I do not think the commission will give much weight to the effect this decision will have on altering jobbing territory. It does not matter a great deal to the people of Spokane whether they purchase their goods through Spokane jobbers or through jobbers from other points, but it does concern them much whether they are compelled to pay more for those commodities on account of the rates charged. It appears plain that Spokane does have to pay more for things purchased here on account of the freight rates charged by the railways. It may be possible that this is justified by the peculiar conditions. This is the point at issue. I have seen catalogues of a furniture concern which has houses in St. Paul, Seattle and Spokane. In the catalogue prices for St. Paul and Seattle he pointed out that the price on a certain article was $20, with the notation, 'Add $1.20 for Spokane.' This is said to be on account of the freight rates."

Mr. Prouty also indicated to the representatives of Spokane that they could not expect the commission to fix rates as low as those which were made by the railways themselves five years ago as a result of a boycott of all lines except the Oregon Railroad & Navigation Company. The commissioner said: "The railways fixed those rates because you men virtually compelled them to do so. You were sending all of your traffic over the O. R. & N., and in that way were able to hold them up and make them do it. The commission cannot approach the question in that manner, but must establish such rates as will be fair and equitable as between the carriers and the consumers and producers of the commodities carried."

H. M. Stephens, counsel for the Spokane interests, contended that it was to the interest of the consumers in the territory surrounding Spokane that rates should be fixed to Spokane which would enable the jobbers at that point to effectively meet the competition of the jobbers at the coast, as otherwise the effect would be to put the jobbers at Spokane out of business and to cause freight from the East to be hauled to the Pacific coast and then jobbed back from there.

J. G. Woodworth, traffic manager of the Northern Pacific, presented in evidence tables compiled by the auditing department of this road to show the loss of revenue it would suffer from the establishment of the rates which the roads proposed to adopt, in compliance with the commission's original decision in the Spokane case. These tables show an estimated loss on business from the East to Spokane of $172,000 a year; from the East to Spokane common points of $114,000, and from the Pacific coast to Spokane points of $110,000 a year. He referred to reductions in grain rates recently ordered by the Washington railway commission and acceded to by the railway which would amount to $300,000 a year.

Mr. Woodworth referred to the increasing competition to which the northern lines are being subjected owing to the construction of the Chicago, Milwaukee & Puget Sound and to the fact that the Oregon Railroad & Navigation Company will soon get into Seattle. He said that at present the Canadian Pacific handles approximately 5 per cent. of the freight traffic to Seattle and the Union Pacific through Spokane 5 per cent., and that the Great Northern and the Northern Pacific divide the rest. He estimated that in future the Oregon Railroad & Navigation Company and the Chicago, Milwaukee & Puget Sound will get 15 per cent. of the business and that the earnings of the older roads will be correspondingly reduced. Commissioner Prouty interrupted him to remark that Seattle enthusiasts predict that the business of that city will increase 100 per cent. within five years. Mr. Woodworth introduced a tabulation to show that in the Spokane jobbing territory the new rates proposed by the northern lines will increase the advantage of Spokane jobbers at points at the limits of that territory over their competitors from 4.69 cents per 100 lbs. to 29.9 cents per 100 lbs. on commodities originating at Chicago or west, and will decrease their advantage at the same points from 1.88 cents per 100 lbs. to 1.105 cents per 100 lbs. on commodities originating at New York or Boston. He said that statistics of his road's shipments to Spokane show that only 11 per cent. of them come from east of Chicago. It was shown that the average ton-mile revenue on all traffic on the Northern Pacific had decreased from 10.65 mills in 1898 to 8.95 mills in 1908. W. M. Cousins, of the Oregon Railroad & Navigation Company, offered 27 tabulations of commodity rates for long hauls to show that the rates to Spokane are lower on the ton-mile basis than rates in other territory.

Five members of the commission heard arguments in the case on October 4. These were Commissioners Prouty, Clements, Lane, Cockrell and Clark. Arguments were made by representatives of railway and shippers in all sections of the country, among those who spoke being H. C. Barlow, Chicago Association of Commerce; Nathan Bijur, representing the Merchants' Association of New York and shippers' organizations at Springfield, Northampton, Marlboro, Haverhill and Worcester, Mass., at Westerly, R. I., and at Bellows Falls, Vt.; Seth Mann, San Francisco Shippers' Association; Charles Donnelly, Northern Pacific; C. F. Dillard, commerce counsel of the Harriman Lines; W. W. Cotton, general attorney of the Oregon Railroad & Navigation Company; Hale Holden, Great Northern, and H. M. Stephens, of Spokane. Mr. Barlow said that Chicago could not ask as low rates as St. Paul but it has a right to expect that it will be given lower rates than points east of Chicago. He, therefore, defended the scheme

of the carriers as logical. Mr. Bijur said that the carriers by their experience in the past had found that blanket rates disregarding distance are justified by conditions and to the best interest of themselves and the western communities, and contended that if water competition is a controlling factor rates from the East to the Pacific coast and to inland points should be as low as from Chicago. The policy of all parties should be to give and take, but it appeared to him the policy of Chicago is to take and take. Counsel for the railways defended the rates suggested by the roads to the commission last May.

STATE COMMISSIONS.

The Kansas Railway Commission has notified the Pullman Company that unless it makes a maximum berth rate of $1.50 and a maximum seat rate of one-half a cent a mile in Kansas by November 15, proceedings will be begun to compel the adoption of these rates. The rates demanded are those which have been established in Oklahoma.

The Georgia state railway commission has decided that, beginning November 1, the Georgia Railroad Company may raise its passenger fares from 2¼ cents a mile to 2½ cents. The railway company asked this on the ground (1) that the Atlantic Coast Line and other roads in the same territory charged the higher rate, and (2) that the lower rate is not compensatory. Commissioner Candler, writing the opinion, says that the first point is untenable; but, on the second, to which he has given months of patient investigation, he is forced to agree with the road. The net earnings for the past four years (years ending August 31) have been, in thousands of dollars, 763, 435, 456, 569, the last figure being for the latest year. But the recovery of the past two years has been entirely in freight and in the reduction of expenses. The gross passenger revenues for the same four years have been 732, 774, 749, 714. The operating expenses have not shown extravagance. Large sums have been spent for maintenance of road and equipment, but such expenditures are to be commended. The Georgia Railroad has not so large a proportion of interstate traffic (not within the jurisdiction of the commission) as the other principal roads of the state.

The Arizona Railway Commission has asked all the railways doing business in the territory to readjust their rates on live stock. It has suggested a distance tariff. The proposed standard rate on cattle is $16 per car for the transportation of a 36-ft. car 20 miles. For distances of 20 to 100 miles the rate would advance $1 per car for each additional five miles traversed, and for distances from 100 to 400 miles the rate would advance $1 per car for each additional 10 miles traversed. The rate for hauling a 36-ft. car loaded with horses and mules 20 miles would be $20. This would be increased $1 for each additional four miles up to 100 miles, and from 100 to 400 miles the rate would advance $1 for each eight miles. The rates on hogs, sheep, goats and range cattle would grade upward in a similar way, although they would be lower. The commission says that the present practice of publishing special live stock rates between certain points is unsatisfactory because it leaves many points unprovided for, resulting in the frequent use of class rates, which are excessive for live stock movements. It also asserts that the average rates at present are high and inconsistent. The commission expresses the opinion that the rates suggested are low enough to develop new business and high enough to bring satisfactory returns to the carriers. It makes no suggestion as to rates for distances under 20 miles.

COURT NEWS.

At Columbus, Ohio, October 12, the state circuit court decided that the state railway commission has no power to establish rules for the collection of demurrage on cars engaged in interstate traffic. This confirms the decision of a lower court, issued last spring.

Judge Henry C. Niles, of the federal court at Jackson, Miss., issued a temporary injunction on October 7, at the instance of the Yazoo & Mississippi Valley, restraining the Mississippi Railway Commission from enforcing the reduced freight rates on uncompressed cotton which were to have gone into effect on October 8.

A grand jury in the federal court at Cincinnati, Ohio, on October 7 returned an indictment against the Lake Shore & Michigan Southern for the alleged acceptance by this road of rebates. The allegation is that on a shipment of ties from Tennessee to Brian, Ohio, the Lake Shore got a rebate of 4.6 cents per 100 lbs. from the Cincinnati Northern, which hauled the ties from Cincinnati to Brian.

Judge Humphrey, of the federal court, issued a temporary injunction at Springfield, Ill., on October 13 restraining the attorney general of Illinois and other state officers from enforcing the state 2-cent fare law against the Chicago, Peoria & St. Louis or the receivers, John P. Ramsey and H. M. Merriam. The receivers will restore the 3-cent rate where competition does not hinder. The injunction was issued on a petition filed by the receivers.

The United States district attorney at Chicago has filed a petition in the United States circuit court asking for an immediate hearing of the case begun by the Rock Island to restrain the Interstate Commerce Commission from enforcing its order in the Des Moines rate case. The Rock Island asked the commission for a rehearing of the case, but its application was denied. The commission's order for a reduction of rates from Chicago to Des Moines went into effect on October 20.

The supreme court of the state of Washington in a decision issued October 9 refused to order Robert E. Strahorn, president of the North Coast, to tell who are his backers in the building of this line. The road condemned property in Spokane. The former owners appealed to the supreme court to set the condemnation aside unless the company proved that, as required by law, the majority of its stock is not owned by aliens. The supreme court said that the point was not well taken; the burden of proof is on the plaintiff to prove that the road is owned by aliens.

The United States circuit court has decided to review the case in which the Belt Railway of Chicago questions the application of the safety appliance law to a road operating entirely within a single state. The Belt Railway was prosecuted for alleged failure to have its cars and engines provided with safety appliances as required by the federal law and was fined by the circuit court, which held that although the road is situated entirely in one state the switching which it did was a part of the handling of certain interstate traffic, and that while switching that traffic the Belt line was an interstate carrier and as such subject to the law.

The New York State Court of Appeals, on Tuesday of this week, decided the case of the Jamaica Bay Water Supply Co., against the state board of tax commissioners, interpreting the franchise tax law. In substance the decision holds that the state tax on a special franchise, as, for example, the property or the rights of a corporation in a street, may be rightfully equalized to correspond with the rate of assessment adopted by local assessors; and that on the question whether the courts may set aside an assessment, made by the state board, on the ground that it has been based on an incorrect calculation of the net earnings, no rule can be laid down. A court may, however, in the absence of proof, take judicial notice that 6 per cent. is a fair return. It is said that special franchise taxes aggregating $41,000,000 have remained unpaid waiting for this decision.

Railway Liable for Conductor's Act.

The Indiana Supreme Court has affirmed a judgment for $600 against the Baltimore & Ohio as damages to a passenger who was choked by a conductor. In making change for cash fare the passenger said something that angered the conductor. The court held that "mere words, however abusive," used by the passenger to the conductor, could not justify an assault and battery, and that the railway company was bound to protect a passenger from injury by its employees.

Railroad Officers.

ELECTIONS AND APPOINTMENTS.

Executive, Financial and Legal Officers.

W. R. Begg, general solicitor of the Great Northern at St. Paul, Minn., has resigned to go into private practice.

A. A. Allen, vice-president and general manager of the Missouri, Kansas & Texas at St. Louis, Mo., has been elected president, succeeding Adrian H. Joline, resigned.

Charles M. Hays, second vice-president and general manager of the Grand Trunk at Montreal, Que., has been elected president, succeeding Sir Charles Rivers Wilson, resigned, effective Jan. 1, 1910.

T. W. Leary has been elected president of the Southern Express, succeeding the late M. J. O'Brien. The offices of first and second vice-presidents have been abolished, and C. L. Loop has been elected vice-president.

F. L. Fox, auditor of the Toledo, Peoria & Western at Peoria, Ill., has been elected secretary and treasurer, with office at Peoria, succeeding E. D. Usner, deceased. R. S. Hay has been elected auditor, succeeding Mr. Fox.

The general offices of the Licking River have been transferred from Chicago to Cincinnati, Ohio. J. H. Fulmer, Jr., has been elected vice-president, succeeding R. H. Lanyon; H. G. Niles, Jr., has been elected secretary, succeeding M. M. Snow, and J. A. Roper has been elected treasurer, succeeding C. M. Mohr.

M. B. Cutter, who recently resigned as general manager of the Minneapolis & St. Louis and the Iowa Central, has been elected president and general manager of the Tonopah & Goldfield. Mr. Cutter was born October 10, 1860, and began railway work in 1876 as messenger with the Chicago & North Western; from 1878 to 1881 he was a conductor on that road. In 1881 he went to the Northern Pacific as conductor, and in 1884 was made a clerk, remaining with that company until 1887, when he went to the Chesapeake & Ohio as chief clerk, and the following year was appointed division superintendent on the same road. From 1889 to 1891 he was division superintendent of the Wisconsin Central, and in 1891 he became general superintendent of the Chesapeake, Ohio & Southwestern, now part of the Illinois Central, and of the Louisville, New Orleans & Texas, now part of the Yazoo & Mississippi Valley. In 1893 he was appointed division superintendent of the Baltimore & Ohio, which position he held until 1897, when he became superintendent of transportation of the Lehigh Valley. In February, 1903, he was made general superintendent, and in December, 1904, general manager of the same road, leaving that position in 1908 to become general manager of the Minneapolis & St. Louis and the Iowa Central.

M. B. Cutter.

W. G. Lerch, whose appointment as assistant to the president of the Chicago Great Western has been announcel in these columns, was born at Erie, Pa., June 16, 1871. He began railway work in June, 1893, as stenographer in the office of the general manager of the Duluth, Missabe & Northern. He was later promoted to chief clerk in the same office, and in January, 1897, was made a clerk in the operating department of the Chicago, St. Paul, Minneapolis & Omaha at St. Paul, Minn. He then became a clerk in the office of the vice-president of the Missouri, Kansas & Texas at St. Louis, Mo. He was made chief clerk in charge of purchases of the Colorado Midland at Denver in April, 1897. In September, 1900, he was made secretary to the president of the Chicago & Alton at Chicago, and became chief clerk to the president in January, 1902. From January, 1908, to February, 1909, he was assistant to the president of the Mexican Central. He then did special railway work, and in July, 1909, became assistant to the chairman of the board of the Tennessee Central at Nashville, Tenn. He was appointed to his present position on Oct. 2.

John F. Coykendall, whose election as secretary and treasurer of the Chicago Great Western, with office at Chicago, has been announced in these columns, was born October 25, 1859, at Canton, Ill. He received a common school education and began railway work January 1, 1881, with the Wabash at Peoria, Ill. He entered the service of the Chicago, Burlington & Quincy in 1883 and went with the Union Pacific in 1887. From 1892 to 1904 he was traffic manager of Fraser & Chalmers and of the Allis-Chalmers Company, and was made traffic manager for Chalmers & Williams in 1907. The last two years he has been secretary to the receiver for A. Booth & Company, Chicago.

J. F. Coykendall.

Operating Officers.

W. N. King has been appointed a trainmaster of the Missouri, Kansas & Texas, with office at Greenville, Tex.

W. W. Hubbard has been appointed general manager of the Licking River, with office at Cincinnati, Ohio, succeeding J. W. Morrison.

James Connor has been appointed trainmaster of the Fort Worth division of the International & Great Northern, with office at Mart, Tex.

J. I. Fox has been appointed assistant trainmaster of the Indian Territory division of the Rock Island Lines, with headquarters at Haileyville, Okla.

B. Lantry, yardmaster of the Chicago & Alton, at Springfield, Ill., has been appointed an assistant trainmaster on the Bloomington-St. Louis division.

S. H. Henderson, chief despatcher of the Chicago & Alton, at Bloomington, Ill., has been appointed a trainmaster of the Kansas City Southern, with office at Pittsburg, Kan.

J. T. Grove, chief despatcher of the Fort Worth & Denver City, at Wichita Falls, Tex., has been appointed a trainmaster, with office at Childress, Tex., succeeding R. G. Fitzpatrick, promoted.

C. C. Holtorf, roadmaster and trainmaster of the Chicago, Burlington & Quincy at Deadwood, S. Dak., has been appointed an assistant superintendent, with office at Deadwood, and will have jurisdiction over the line from Edgemont to Deadwood and all branches connecting with that line.

C. W. Stoneburner, recently appointed trainmaster of the Iowa & St. Louis and the Novinger coal district, with office at Novinger, Mo., was formerly chief clerk of the transportation department of the Quincy, Omaha & Kansas City, and not superintendent of that company and the Iowa & St. Louis, as previously stated in these columns.

F. H. Meyer, whose appointment as superintendent of the

River, Chippewa Valley and Wabasha divisions of the Chicago, Milwaukee & St. Paul has been announced in these columns, was born at Adeline, Ill., September 5, 1875. He began railway work in 1891 as station helper and later was operator and agent with the Chicago, Milwaukee & St. Paul, becoming division operator at Chicago in November, 1900. In 1901 he was made assistant train despatcher and was promoted to chief train despatcher at Savannah, Ill., in 1905. He was appointed assistant superintendent of the Chicago terminals in 1907, and in May, 1908, was promoted to superintendent of the Prairie du Chien and Mineral Point divisions at Milwaukee, Wis., from which position he was recently promoted.

Traffic Officers.

E. U. Baker has been appointed division freight agent of the Erie, with office at Bradford, Pa., succeeding Charles Cole, deceased.

F. A. Brennan has been appointed traffic manager of the Licking River, with office at Cincinnati, Ohio, succeeding T. C. Beyland.

H. A. Richards has been appointed a commercial agent of the Grand Trunk, with office at Kansas City, Mo., succeeding Horace Seely, resigned.

W. C. Thomas has been appointed a commercial agent of the Michigan Central, with office at Toledo, Ohio, succeeding W. S. Rogers, promoted.

H. E. Matlock, traffic freight agent of the Chicago Great Western at Chicago, has been appointed a commercial agent, with office at Cincinnati, Ohio.

J. G. Morrison has been appointed assistant general freight agent of the Chicago Great Western, with office at Chicago, succeeding F. H. Titus, deceased.

W. H. Mitsch has been appointed district passenger agent of the Chicago Great Western at St. Paul, Minn., succeeding H. L. Wyand, resigned to go into other business.

H. R. Griswold, division freight agent of the Vandalia Railroad at St. Louis, Mo., has been appointed an assistant general freight agent, with office at St. Louis. C. B. Sudborough succeeds Mr. Griswold.

S. T. DeMilt, assistant general agent of the Mallory Steamship Company at Galveston, Tex., has been appointed general agent, with office at Galveston, succeeding J. B. Denison, transferred to New York.

F. R. McMillin, traveling passenger agent of the Southern Railway at Atlanta, Ga., has been transferred to Richmond, Va. J. D. Ruden, traveling passenger agent at Houston, Tex., succeeds Mr. McMillin.

Ingersoll Goodwin, traveling passenger agent of the Pere Marquette at Chicago, has been appointed city passenger agent at Chicago, succeeding R. C. Schultz, resigned. E. A. Hopperstead succeeds Mr. Goodwin.

J. W. Hyams has been appointed a general agent of Morgan's Louisiana & Texas Railroad & Steamship Company and of the Louisiana Western, with office at New Orleans, La., succeeding J. M. Lee, Jr., deceased.

G. E. Allen, passenger and ticket agent of the Mobile & Ohio at Jackson, Tenn., has been appointed a traveling passenger agent, with office at Jackson, succeeding H. E. Jones, Jr., resigned to accept service elsewhere.

F. J. Hoffman has been appointed assistant to F. O. Becker, chairman of the Western Railway Weighing Association, the Western Railway Inspection Bureau, and the Western Classification Committee, with office at Chicago.

C. McKinsley has been appointed a traveling freight agent of the Atchison, Topeka & Santa Fe at Hutchinson, Kan., succeeding E. E. Hogueland, resigned to become assistant to attorney of the Kansas Railroad Commission.

Charles Patton, traveling passenger agent of the Atlanta, Birmingham & Atlantic at Atlanta, Ga., has been appointed a traveling freight agent, with office at Cincinnati, Ohio, succeeding R. D. T. Hollowell, resigned to accept service elsewhere.

T. W. Proctor, assistant general agent of the Chicago, Milwaukee & St. Paul at Chicago, has been appointed general agent of the freight department, with office at Chicago, succeeding G. B. French, resigned to accept service elsewhere.

A. L. Craig, formerly general passenger agent of the Great Northern at St. Paul, Minn., has been appointed general passenger agent of the Chicago Great Western, with office at Chicago, succeeding J. P. Elmer, resigned to engage in other business.

Joseph McIlroy, Pacific coast passenger agent of the Missouri, Kansas & Texas at San Francisco, Cal., has been appointed a general agent, with office at San Francisco. J. T. Bate, commercial agent at Los Angeles, Cal., has been appointed a general agent, with office at Los Angeles.

O. V. Wilson has been appointed a traveling freight agent of the Georgia Southern & Florida, with office at Orlando, Fla.; T. E. Harris has been appointed a traveling freight agent, with office at Cordele, Ga., and L. C. Shirah has been appointed a soliciting freight agent, with office at Macon, Ga.

Hal S. Ray, assistant general passenger agent of the Rock Island Lines, with office at Chicago, has resigned to engage in the advertising business in New York. Fay Thompson, district passenger agent at Cleveland, Ohio, has been appointed district passenger agent at Atlanta, Ga., succeeding S. L. Parrott, promoted. Howard Jolly, traveling passenger agent at Cincinnati, Ohio, succeeds Mr. Thompson.

T. R. Ryan, whose appointment as traffic manager of the Mexico North Western at Chihuahua, Mex., has been announced in these columns, was born on May 17, 1870, at Fairfield, Vt. He was educated in the common schools and later attended the high schools. On August 1, 1887, he began railway work as clerk in the local station of the Central Vermont at St. Albans, Vt., and was later chief clerk in the freight office at Bellows Falls, Vt. In March, 1890, he went to the Mexican International, now part of the National Railways of Mexico, as chief claim clerk at Ciudad Porfirio Diaz, Mex., and from June 1, 1900, to July 1, 1908, was with the Mexican Central, which is now part of the National Railways of Mexico, consecutively as clerk, chief rate clerk and chief clerk at Mexico City; commercial agent at St. Louis, Mo.; general agent at Louisville, Ky.; southern agent at Cincinnati, Ohio; general agent at Chicago, and general freight agent at Mexico City. In July, 1908, he was appointed general western agent of the National Railways of Mexico at Chicago, and held this office until his present appointment.

Engineering and Rolling Stock Officers.

Francis B. Freeman, engineer of construction of the New York Central & Hudson River at New York, has been appointed chief engineer of the Boston & Albany, with office at Boston, Mass., succeeding Everett E. Stone, resigned. Mr. Freeman was born at Dublin, Ireland, April 2, 1867, and up to 1886 attended the Rathmines school. After leaving this school he worked for one year in locomotive shops, and then from 1887 to 1890 he attended the Royal College of Science in Ireland. He began railway work in 1890 as leveler with a construction crew for a branch of the Midland Great Western of Ireland. Later and until 1892 he was engaged in making surveys and as subagent for the contractor on a line from Westport to Achil, Ireland, and on the Claremorris & Collooney Railway. In 1892 he came to this country and

F. B. Freeman.

went into the employ of Kingsley & Brewer, of New York, doing general survey and electrical railway work, remaining there until 1894, when he went to the bridge department of the Erie Railroad. Here he had charge of designing the masonry for bridge work. He left this position in 1900 to go to the New York Central as chief draftsman. The following year he was appointed assistant engineer in charge of design for the same company, and in April, 1902, assistant engineer in charge of construction at Syracuse, N. Y. Leaving that company in October of the same year he became superintendent of construction of the Catawba Power Co. at Rockhill, S. C. In June, 1903, he returned to the New York Central in charge of joint facilities and agreements in the office of engineer of maintenance of way, remaining in that position until November, 1905, when he was appointed designing engineer. Two years later he was appointed engineer of construction, in charge of all new construction on the New York Central outside of the electric zone, which position he held at the time of his recent appointment.

F. W. Mahl having resigned as mechanical engineer and general purchasing agent of the Colorado & Southern, the duties of that office will be performed by A. D. Parker, vice-president.

The office of master mechanic of the Salt Lake & Ogden at Salt Lake City, Utah, has been abolished, and D. F. Clark has been appointed roundhouse foreman in charge of the mechanical department.

Daniel H. Deeter, division master mechanic of the Philadelphia & Reading, at Reading, Pa., has been appointed to the new position of general master mechanic of the Philadelphia & Reading and subsidiary lines, with office at Reading, Pa. All division master mechanics, also the general locomotive inspector and the general boiler inspector, will report to the general master mechanic. George H. Smeltzer, acting superintendent car department at Reading, has been appointed superintendent of the Reading locomotive and car shops.

Purchasing Officers.

Louis Lavoie has been appointed to the new position of general purchasing agent of the Intercolonial Railway.

Special Officers.

J. N. Stewart, in charge of advertising of the Northern Pacific, at St. Paul, Minn., has resigned to become connected with the Stack-Parker Advertising Agency of Chicago.

OBITUARY.

Max Bass, general immigration agent of the great Northern at Chicago, died in that city on Oct. 17.

George D. Fowle, consulting signal engineer of the Pennsylvania, died at his home in Philadelphia, Oct. 14, at the age of 49.

E. Fisher, of Hamilton, Ont., who recently resigned as general superintendent of the Toronto, Hamilton & Buffalo on account of ill health, died on October 12 at the age of 56 years. Mr. Fisher was born at Cincinnati, and was appointed superintendent and chief engineer of the Toronto, Hamilton & Buffalo in 1897.

James Vincent Mahoney, formerly chairman of the Western Trunk Line Committee and of the Western Passenger Agreement, died on Oct. 13 at Chicago. Mr. Mahoney was born in 1851 in Ireland. He received a common school education in Illinois and began railway work in 1869 as chief clerk in the general freight office of the Wabash at Springfield, Ill. He was then consecutively general freight agent of the Chicago, Rock Island & Peoria; general freight agent of the Chicago, Pekin & Southwestern, now a part of the Atchison, Topeka & Santa Fe; division freight agent of the Chicago, Milwaukee & St. Paul; traffic manager of the Sioux City & Northern, now a part of the Great Northern, and superintendent of the passenger department of the Pan-American Exposition at Buffalo, N. Y. In July, 1901, he was made chairman of the Western Trunk Line Committee and of the Western Passenger Agreement. He held the former position until 1908.

Railroad Construction.

New Incorporations, Surveys, Etc.

Albany & Southern (Electric).—According to press reports bids are being asked for work in connection with the double-tracking from the south end of the viaduct in Rensselaer, N. Y., to North Chatham, about 13 miles. C. A. Alderman will have charge of the work. (Sept. 17, p. 520.)

Alberta Central.—An officer writes that plans are made to begin work next year on this line, projected from Red Deer, Alb., west to a point on the Grand Trunk Pacific at Yellow Head Pass, about 200 miles; from Red Deer east to Moosejaw, Sask., with a branch from the main line near Battle river north to Saskatoon or Warman. Surveys are now being made both east and west of Red Deer. The government has granted a subsidy of $3,200 a mile for 75 miles from Red Deer west. The work will be fairly difficult; maximum grades are to be $^4/_{10}$ per cent. and maximum curvature 3 deg. There will be three steel bridges over the Red Deer, the Medicine and Saskatchewan rivers. J. T. Moore, president, and J. G. MacGregor, chief engineer, both of Red Deer. H. W. Raphael is acting secretary, Montreal. (Oct. 1, p. 612.)

Alexandria & Western.—An officer writes that it is expected to start work about December 1 from Alexandria, La., west via Leesville to the Sabine river, at the Texas border. The line will have a grade of $^5/_{10}$ per cent. G. F. Cotter, president, and I. W. Sylvester, chief engineer, Fort Worth, Tex. (Oct. 1, p. 612.)

Angelina & Natchez River.—This line, which was built by the Angelina County Lumber Co., is said to be in operation from Keltys, Tex., two miles west of Lufkin, east to a point on the Angelina river, 20 miles. Contract is said to have been let to build several miles on the Nacogdoches side of the Angelina river opposite the present terminus at Ratcliffe Bluffs. It is understood that an extension will be built north in the direction of Chinero, in Nacogdoches county. J. H. Kurth, president, Keltys. (March 16, p. 651.)

Atlanta, Birmingham & Atlantic.—An officer is quoted as saying that the company will be operating trains over its own tracks about April 1 into Birmingham, Ala. This means that work will be started at once on the surveyed line between Bessemer and Birmingham. The present line extends only to Pelham, from which place the company has trackage rights over the Louisville & Nashville into Birmingham. Grading has been finished from Pelham to Bessemer and that section of the line will be finished within a short time. Work on the line was suspended recently, pending a change in the Alabama laws in order that this company could secure the necessary right-of-way. (Aug. 20, p. 339, and Aug. 27, p. 376.)

Bandon-Port Orford Railroad Navigation Co.—An officer writes that this company was organized in July, with headquarters at Bandon, Ore. Work has been started clearing the right-of-way from Bandon south to Port Orford, 26.5 miles. The line is to have a grade of .40 of one per cent., with a maximum curvature of 2 deg. There is to be 4,000 ft. of timber trestlework. Contracts for grading and track-laying will be advertised for this fall and let early next spring. The work will be easy; the route follows the coast all the way to Port Orford, where there is a good harbor. There is also a good harbor at the northern terminus at Bandon. S. D. Henderson, general manager, Bandon; Elmer Hughes, of Portland, is the engineer in charge. (Sept. 24, p. 562.)

Bedford, Fulton & Franklin (Electric).—Incorporated in Pennsylvania, with $300,000 capital, to build from Bedford, Pa., east to Chambersburg, 50 miles. M. J. Murphy, president, Pittsburgh, Pa.

Canadian Northern.—Plans are said to have been filed for the first 54 miles of a line to be built north of Kamloops, B. C. A grade of 1 per cent. is said to have been found by the engineers between Kamloops and Yellow Head Pass.

Canadian Pacific.—The bid of Chancel, McDonald & Timothy, of Calgary, Alb., is said to have been accepted for building the remaining section of the Esquimault & Nanaimo to Alberni, on Vancouver island, B. C.

CAZENOVIA & SAUK CITY.—Building from Lavalle, Wis., southwest to Cazenovia, six miles, which it is expected will be finished about the middle of December. The line is to be further extended from Cazenovia to Richland Center by April, 1910. The Chicago Construction Co., of Chicago, is building the line. (March 19, p. 652.)

CHICAGO, MILWAUKEE & PUGET SOUND.—A contract is said to be let to the Sullivan Supply & Implement Co., of Seattle, Wash., for the construction of concrete walls at the Sorrento, Idaho, tunnel, at a point 12 miles east of Tekoa, Wash. The work is to be started at once and will take about one year to complete.

CHICAGO, MILWAUKEE & ST. PAUL.—According to press reports double-tracking work is to be carried out from Wabasha, Minn., to Richmond, to complete the double-track line from La Crosse, Wis., to Minneapolis. Improvements are also to be made from Glencoe, Minn., west to Aberdeen, S. Dak., for heavy through traffic in connection with the Chicago, Milwaukee & Puget Sound.

COAHUILA, CHIHUAHUA & NORTH WESTERN.—This is the name of the company which has just completed its organization in Mexico City to build from Monclova, on the International division of the National Railways of Mexico, northwest to a connection at Chihuahua with the Mexican Central, the Kansas City, Mexico & Orient and the Mexico North Western. It is said that the building of the line is assured. Surveys for the entire distance were made under the direction of the chief engineer of the National Railways of Mexico, and it is supposed the project is backed by the government. Joaquin D. Casasus, who is closely identified with the government system of railways; J. Pimentel, A. L. Negrete, H. Scherer, Jr., and E. Hartman, are interested. (See Mexican Roads, Sept. 10, p. 470.)

COLUMBUS & CINCINNATI AIR LINE TRACTION.—Incorporated in Ohio, with $10,000 capital, and office at Columbus, Ohio. The plans call for a line from Columbus, Ohio, southwest via Franklin, Pickaway, Madison, Fayette, Clinton, Warren, Clermont and Hamilton counties to Cincinnati, about 115 miles. The incorporators include: R. W. Walton, E. Tompkins, F. E. Ruth, W. L. McVey and M. M. Recob, all of Columbus.

CONCORD & MONTREAL.—An officer writes that plans are being made to rebuild the abandoned section of the Concord & Portsmouth between Suncook, N. H., and Candia, providing arrangements can be made to lease this section to the Concord & Montreal. The new route would shorten the distance between Portsmouth and Concord about eight miles. The offices of the company are at Concord.

ENID, OCHILTREE & WESTERN.—An officer writes that grading has been finished on about 35 miles and track-laying has just been started at Dallas, Tex. The projected route is from Dalhart southeast via Dumas, Parksdale and Hansford. The line is to have a total length of 112 miles. G. M. Perry, president, Ochiltree; W. R. Allen, chief engineer, Dalhart. (Oct. 15, p. 725.)

ERIE.—An officer writes that the Bergen Hill cut, which is to be used instead of the present tunnel for passenger traffic from Jersey City under Bergen hill, will be opened for train service by February, 1910. Much work yet remains to be done. A day force of 700 men and a night force of 500 men are now at work. This is part of the Jersey City, N. J., terminal improvements. (March 19, p. 653.)

ESQUIMAULT & NANAIMO.—See Canadian Pacific.

EUNICE, LAFAYETTE & ABBEVILLE.—An officer writes that this company has completed its organization and has finished surveys for a line to be 52 miles long, with seven miles of sidings. The projected route is from Eunice, La., southeast via Church Point to Lafayette, thence southwest to Abbeville. It is expected to begin construction work in January, 1910. James J. Lewis, president; J. N. Green, vice-president, Eunice.

FORT WORTH & RIO GRANDE.—An officer writes that contracts were to be let October 20 for a branch from Brady, in McCulloch county, Tex., southwest to Menardville, 37 miles. The work will be easy, maximum grades will be three-quarters of 1 per cent. and maximum curvature 3 deg. (Sept. 24, p. 563.)

GARDEN CITY, GULF & NORTHERN.—According to press reports track laying will be finished this month from Garden City, Kan., to Scott, about 40 miles, where connection is to be made with the Atchison, Topeka & Santa Fe and the Missouri Pacific. Work is said to be under way on shops and a roundhouse at Garden City. B. M. McCue, president, Garden City. (May 21, p. 1099.)

GLEN ROSE & WALNUT SPRINGS.—An incorporator writes that work was started October 7 on the line to be built from Walnut Springs, Tex., north to Glen Rose, about 15 miles. The line is eventually to be extended northeast to Fort Worth. The work is being done by the company's men, and includes one bridge. T. C. Lees, president, Walnut Springs. T. M. Simpson, of Dallas, with headquarters at Glen Rose, is the engineer in charge.

GRAND TRUNK PACIFIC.—An officer is quoted as saying that this line will be finished from the head of Lake Superior west to the Rocky mountains by June 1, 1910, at which time both freight and passenger service will be put in operation.

A contract is said to have been given to O'Brien, Fowler & McDougall, of Fort William, Ont., for building a 200-mile section of the National Trans-Continental near Nepigon, Ont. Sub-contracts are reported let to McEwen & Barry and to Harvey & Bonefield, both of Fort William, for work near Fort William.

The annual report of the National Transcontinental, which is building the section from Winnipeg east to Moncton, N. B., 1,804 miles, shows that $24,892,772 was spent during the fiscal year ending March 31, 1909, and that the total expenditure up to that time was $51,950,717, at which time there was 725 miles graded and 345 miles of track laid, and all the line under contract. On October 12 track-laying was finished on the section connecting Winnipeg with Fort William, Ont., via the Lake Superior branch, but it is not expected that the line will be used for traffic until next spring, as the bridge over the Red river is not yet finished.

GREENVILLE, GREENWOOD & AUGUSTA (ELECTRIC).—An officer writes that a charter has just been secured in South Carolina, with a capital of $1,200,000 and headquarters at Greenville. It is expected to have funds soon to build from Greenville, S. C., south to Greenwood, about 50 miles. It is undecided when the section from Greenwood south to Augusta, Ga., will be built. Henry Briggs, president and treasurer; H. L. Zimmerly, vice-president, and J. P. Charles, secretary, all of Greenville.

GULF, COLORADO & SANTA FE.—An officer writes regarding the reports that surveys have been made south of San Angelo, Tex., via El Dorado to San Antonio, that the company has not made any surveys in that section. A proposition has been made to residents of San Angelo by the railway company to build a line from that place south to the south line of Tom Green county, within two years, provided the necessary right-of-way is furnished, also grounds for a station. Regarding the reported extension from Longview to ore fields in Cass county, the company has not made any surveys, the proposition has not yet assumed definite shape. (See Atchison, Topeka & Santa Fe, Oct. 15, p. 725.)

IDAHO & WASHINGTON NORTHERN.—According to press reports track has been laid to Tiger, Wash., 48 miles from Newport, on the extension being built north via Ione to Metaline. It is expected to begin train service to Ione, 52 miles north of Newport, about November 1. During the winter work will be started on a 10-mile extension to the mouth of Sullivan creek. The line will cross to the east side of the Pend d'Oreille river on a 280-ft. bridge, 90 ft. above high water. (Sept. 10, p. 478.)

LOUISIANA & ARKANSAS.—According to press reports work is being pushed on the branch from Minden, La., west to Shreveport, 30 miles, and it is expected to have the work finished by November 2. (March 26, p. 726.)

LOUISVILLE, BLUE RIVER & FRENCH LICK.—Incorporated in Indiana, to build from New Albany northwest via Galena, Greenville, Palmyra, Fredericksburg, Hardinsburg, Chambersburg, Paoli and West Baden Springs to French Lick Springs, 45 miles. The franchise granted by the Orange county commissioners provides that the entire line must be in operation

by December, 1910. Surveys have been under way for the past three weeks. The incorporators include: J. H. Fawcett, C. D. Kelso and W. W. Gadient, all of New Albany.

Michigan & Chicago Westbound (Electric).—An officer writes that the projected route is from Kalamazoo, Mich., north via Plainwell, Otsego and other small towns, to Grand Rapids, about 52 miles. The line will have a grade of 1 per cent., with 6 deg. of curvature. Charles A. Goodale, president, Rookery building, Chicago. (Oct. 1, p. 613.)

Missouri, Oklahoma & Gulf.—An officer writes that the company now has track laid on 165 miles and contracts are let to J. W. Hoffman & Co., of Tupelo, Okla., for grading, and to the Wisconsin Bridge & Iron Co. for eight steel bridges on the extension from Calvin south towards Sherman and Dennison, Tex.

Montana Roads (Electric).—A. D. Bowen, of Kansas City, Mo., is negotiating with capitalists of Billings, Mont., to build an electric line from that place southwest to Laurel, 19 miles. The estimated cost of the line is $350,000.

Oklahoma, Kansas & Missouri Interurban.—An officer writes that surveys have been made and plans filed, but contracts are not yet let. The projected route is from Miami, Okla., northeast via Hattonville, Quapaw, Lincolnville and Peoria to Hornett, Mo., thence via Spring City to Joplin, in all 35 miles. Track has been laid on five miles between Miami and Hattonville. It is expected to begin work, as soon as financial arrangements are made, in about 60 days. The work includes two bridges and two trestles. The line will use steam and gasoline motor cars for its motive power. Franklin M. Smith, president and general manager, and W. H. Schreiber, chief engineer, Miami.

Oregon Roads.—The Commercial Club, of Eugene, Ore., is negotiating with Stephen Carver to secure a bonus of $40,000 for the first section of a line from Eugene west to Elmira, which is eventually to be built west to Siuslaw. It is said the Lane County Asset Co. has projected a line over this route and is trying to interest capital in the project.

Oregon Short Line.—According to press reports double-tracking work is now under way between Pocatello, Idaho, and McCammon, 23 miles.

Philadelphia & Reading.—Bids are in for the construction of the new elevated line between Brown and Jefferson streets, Philadelphia. The letting of these contracts was made necessary through the failure of the original contractor to keep within the time requirements. Five bidders submitted estimates for the foundation work for the steel viaduct from the south side of Brown street to the north side of Jefferson street. Separate bids were also filed for a second section of the work with scale foundations, new buildings, etc., at the Master street yards. (July 23, p. 169.)

St. Louis, Brownsville & Mexico.—An officer writes that a contract has been let to P. M. Johnston & Co., of St. Elmo, Ill., and work is now under way on the branch from Bloomington, in Victoria county, Tex., south via Green Lake to Seadrift thence east to Port O'Connor, 39.72 miles. The work involves handling an average of 8,000 cu. yds. to the mile. Maximum grades will be $^{2}/_{10}$ per cent. and maximum curvature 2 deg. The rails, ties and other material have already been bought and are being assembled. A large section of country near this branch is being developed by the Calhoun County Cattle Co., and extensive improvements are to be made at Port O'Connor. (Oct. 8, p. 662.)

St. Louis Southwestern.—According to press reports this company will build an extension from Gatesville, Tex., south to Austin and possibly to San Antonio.

Sioux City & Spirit Lake (Electric).—This road is to run from Sioux City, Iowa, northeast via Potosia, Ellendale, Le Mars, Granville, Pinghar and Hartley to Spirit lake. Grading on four miles will be heavy. Work on this section may be carried out during the coming winter. Frank Patch, president; B. C. Woolley, acting chief engineer, Sioux City, and Westinghouse, Church, Kerr & Co. are the engineers. (Sept. 24, p. 564.)

Southern.—An officer writes that contracts for double-tracking work being carried out from Salisbury, N. C., to Glass have been let as follows: Salisbury to China Grove, 8.7 miles, to M. M. Elkan, of Macon, Ga.; China Grove to Glass, eight miles, to Lane Brothers Co. & Jones, of Altavista, Va. This work is merely laying an additional track parallel to the present track and upon the same grades. Contracts were also let early this month for double-tracking the line from the yards north of Charlotte, N. C., to Harrisburg as follows: From yards to Newells, 5.4 miles, to M. M. Elkan; from near Newells to Harrisburg, 6 miles, to Lane Brothers Co. & Jones. This work also consists of laying an additional track parallel to the present one and upon the same grades. With the completion of these improvements the line from Salisbury to Charlotte will be double-tracked, with the exception of a gap of single track between Harrisburg and Glass of 13.1 miles.

The report for this company for the year ended June 30, 1909, under date of October 8, shows that during the year construction work, which was suspended in the summer of 1907, was resumed and substantial progress made towards its completion. The principal work included a revision of grade and double-tracking the main line south from the terminal yard at Monroe, Va., across the James river, through the city of Lynchburg, thence across the Staunton river to Sycamore, a total of 38.14 miles, shortening the old line 2.16 miles. A section of this new double-track from Durmid to Sycamore, 30 miles, has been in operation since April 30, 1909. The work will be heavy on the remaining section, involving the construction of a viaduct over the James river and a tunnel 1,300 ft. long near the city of Lynchburg. It is expected to have the line ready for operation in the spring of 1910. Double-tracking work was resumed on 14 miles of line, over which the Knoxville and the Atlantic lines converge at Oltewah junction, Tenn., to reach the city of Chattanooga. Similar work is under way on 2.63 miles north from Greensboro, N. C., and on 4.4 miles west from Asheville. Since the close of the fiscal year contracts have been let for work in North Carolina, as noted above. During the year sections of the projected low-grade Little Tennessee River line, connecting Knoxville, Tenn., with North and South Carolina, upon which work was begun several years ago, was completed and put in operation as follows: 25.3 miles from Maryville, Tenn., to Chilhowee, built under the name of the Tennessee & Carolina Southern, and 13.9 miles from Bushnell, N. C., to Fontana, built under the name of the Carolina & Tennessee Southern. These lines are open for local service, but it is not proposed to push the work through to completion at once. See report elsewhere in this issue.

Stamford & Northwestern.—See Wichita Valley.

Sugarland Railway.—According to press reports this company, operating a line from Sugarland, Texas, southeast to Arcola, is said to have let contracts to build about 25 miles of spur tracks in Fort Bend, Harris and Brazoria counties.

Titusville Southern.—Incorporated in Pennsylvania, with $250,000 capital, to build from Titusville south to South Oil City, 20 miles. The directors include: W. E. Wellborn, president, Weston, N. J.; J. L. Strauss, C. B. Miller, H. W. Fry, C. L. Miller, H. S. Miller and C. H. Hollinger.

Western Pacific.—An officer writes under date of October 11 that track has been laid on all but 37 miles of this line, building from Salt Lake City, Utah, west to Oakland, Cal., opposite San Francisco, 923.7 miles, and that the grading and bridge work has been finished. The work included 40 steel bridges, aggregating 9,261 ft., and 43 tunnels, with a total length of 45,486 ft. It is expected to have all the track laid by November 5, and to have the line in operation by December for freight traffic and early next year for passenger traffic. Ballasting remains yet to be done on about 125 miles. The terminals and stations will be ready at the time the line is put in operation. (Oct. 15, p. 728.)

Wichita Valley.—An officer writes that an additional section of the Stamford & Northwestern, from Jayton, Tex., west to Spur, 23.7 miles, will be opened for operation as a part of the Wichita Valley on October 25. (Sept. 24, p. 564.)

Railroad Financial News.

BALTIMORE & OHIO.—Judge Robert S. Lovett, chairman of the board of directors of the Union Pacific, has been elected also a director and a member of the executive committee of the Baltimore & Ohio, succeeding E. H. Harriman, deceased.

BOSTON ELEVATED.—The company is asking the approval of the Massachusetts Railroad Commission and the Boston Transit Commission for the taking over by the Boston Elevated of the Boston & Northern, the Old Colony, the Blue Hills, the Boston & Worcester, the Middlesex & Boston and the Lexington & Boston street railways.

BOSTON RAILROAD HOLDING CO.—The directors are to ask permission of the Massachusetts Railroad Commission to buy an additional $1,575,500 common stock of the Boston & Maine at $154 per share, payable $125 in the bonds of the Holding company and $29 per share in the stock of the Holding company, and for permission to buy $582,600 B. & M. preferred stock at 162 per share, payable 125 in bonds and the remainder in stock of the Holding company. On October 4 $10,994,800 B. & M. stock was bought from John L. Billard at 140. The present purchase will give the Holding company, it appears, $12,570,300 common out of a total of $28,271,790, and $582,600 preferred out of a total of $3,149,800. The Holding company after the purchase will have outstanding, it appears, $16,441,125 4 per cent. bonds and $2,421,600 stock.

CHICAGO & NORTH WESTERN.—The $5,369,000 25-year debentures maturing November 1, 1909, are to be paid when due at the treasurer's office, New York City.

CHICAGO, ROCK ISLAND & PACIFIC.—R. A. Jackson, first vice-president of the C., R. I. & P., and W. T. Graham have been elected directors, succeeding Robert Mather and A. E. Orr.

CHICAGO TERMINAL TRANSFER.—It is reported that the Baltimore & Ohio has purchased a controlling interest in this road from the Chicago, Burlington & Quincy, but that official announcement of the sale will not be made until certain plans of the Baltimore & Ohio shall have been completed. The Baltimore & Ohio now uses the Chicago Terminal Transfer as its Chicago terminal.

CINCINNATI, HAMILTON & DAYTON.—William Salomon & Co., New York, are offering a portion of the total authorized issue of $11,557,000 purchase money collateral trust 4 per cent. notes of 1908-1913 of the Cincinnati, Hamilton & Dayton, principal and interest, of the notes being guaranteed unconditionally by the Baltimore & Ohio. At the offering price the notes yield about 4¾ per cent.

DENVER & RIO GRANDE.—The New York Stock Exchange has listed an additional $5,011,000 first and refunding mortgage 5 per cent. bonds of 1905-1955. Of these bonds, $5,000,000 were issued to buy $6,400,000 Western Pacific second mortgage 5 per cent. bonds and $11,000 for general purposes. The Western Pacific bonds are deposited under the first and refunding mortgage, making a total of $23,230,000 Western Pacific bonds now deposited under this mortgage.

DENVER, NORTHWESTERN & PACIFIC.—The Northwestern Terminal Railway (Denver) has sold to a syndicate of bankers $2,025,000 first mortgage 5 per cent. bonds due 1926, principal and interest guaranteed by the Denver, Northwestern & Pacific. The D. N.-W. & P. leases the Terminal company's property for 99 years.

DYERSBURG NORTHERN.—Control of this road, which runs from Dyersburg, Ky., to Tiptonville, 31 miles, has been bought by John H. Watkins, S. G. Latta & Ernest Rice for a price said to be $316,000. There is $300,000 stock and $250,000 first mortgage 5 per cent. bonds of 1907-1937 outstanding.

MISSOURI, KANSAS & TEXAS.—See an article about the control of this road in another column.

NORFOLK & WESTERN.—Brown Brothers & Co., New York, are offering $2,800,000 4 per cent. equipment trust certificates maturing serially from 1910 to 1917 at prices to yield 4.35 per cent. These certificates are part of the four series of $1,000,000 each created in 1907 and held since that time in the treasury.

NORTHWESTERN TERMINAL RAILWAY (DENVER).—See Denver, Northwestern & Pacific.

OREGON SHORT LINE.—F. V. S. Crosby has been elected a director to fill a vacancy.

PACIFIC COAST CO.—This company controls the Pacific Coast Steamship Co., the Pacific Coast Railway, the Columbia & Puget Sound, the Pacific Coast Coal Co., and owns property in various cities on the Pacific coast, including Seattle, Wash., and Nome, Alaska. In the fiscal year ended June 30, 1909, gross earnings of all companies amounted to $6,580,507 as compared with gross earnings of $7,272,958 in 1908. Operating expenses last year were $5,621,018, and in the previous year amounted to $6,220,626. The two subsidiary companies which show the largest gross earnings are the Pacific Coast Steamship Co., with gross amounting to $3,405,585, and the Pacific Coast Coal Co., with gross amounting to $2,082,534 from the coal department and $36,037 from the lumber department.

The steamship company's gross earnings were less by $287,804 than in 1908, but the expenses were also less, being $3,184,736, or $681,754 less than in 1908. This left net earnings of $220,849 in 1909 as compared with a deficit in 1908. There was spent for repairs and charged to operating expenses $271,337 in 1909 and $502,652 in 1908. The company operates about 20 steamers in the coastwise trade on the Pacific coast, going as far south as Columbia, South America, and as far north as Alaska.

The Pacific Coast Coal Co. mined 660,121 tons of coal last year, a decrease of 38,703 tons as compared with the previous year. Gross earnings from the coal department amounted to $2,082,534, or $471,819 less than in 1908. Expenses amounted to $1,720,879, an increase of $54,883. The decreased demand for coal caused increased competition and consequently lower prices. The San Francisco depot was unfortunate in having on hand a large stock of coal purchased during 1907 when prices averaged about two dollars per ton higher than during 1909. Most of this coal has been sold. The average cost of coal at the company's mine increased over the previous year by about 14.6 cents per ton, partly due to advanced development work, but more to increased taxes. The balance sheet, consolidated so as to show the condition of the various companies, shows current assets of $2,506,946, of which $848,673 is cash. Current liabilities amounted to $723,379.

After paying interest and taxes the Pacific Coast Co. and its subsidiaries showed profit last year of $661,933, out of which dividends of $516,250 were paid, leaving a surplus of $145,683. This, together with the previous credits to profit and loss, brought the credit balance of this account up to $3,207,715.

ST. LOUIS & SAN FRANCISCO.—Speyer & Co., New York, have placed $6,000,000 St. Louis & San Francisco general lien 5 per cent. bonds in Germany. These bonds are part of a block bought some time ago.

SEABOARD AIR LINE.—The final decree terminating the receivership has been signed, and the property is to be turned over to the reorganized company November 4. The reorganization plan is essentially the same as that published in the *Railroad Age Gazette* of July 9, page 81.

WABASH.—Jay Gould has been elected a director, succeeding Judge William B. Sanders, resigned.

WESTERN PACIFIC.—See Denver & Rio Grande.

FOREIGN RAILWAY NOTES.

The Russian Minister of Communications has asked for $13,000,000 for the purchase of locomotives and cars.

Plans have been made for building a railway from Timbo, Brazil, to Propria. A. H. de Carvalho has made a contract with the legislature for carrying on the project. Construction material imported is to be free of duty.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

The Lake Terminal Railway has ordered three six-coupled locomotives from the Baldwin Locomotive Works.

The Seaboard Air Line has ordered 15 passenger locomotives and five switchers from the Baldwin Locomotive Works.

The Boston & Albany is said to have ordered six locomotives from the American Locomotive Co. This item is not yet confirmed.

The Norfolk & Western has ordered five Mallet compounds from the Baldwin Locomotive Works and five Mallet compounds from the American Locomotive Co.

CAR BUILDING.

The Southern is in the market for 1,000 box cars.

The Northern Pacific is in the market for 450 Lidgerwood cars.

The Northern Pacific has ordered 1,500 steel underframe refrigerator cars.

The Pittsburgh Railways Co. has ordered 80 cars from the Kuhlman Car Co.

The Norfolk & Southern has ordered a motor car from the McKeen Motor Car Co.

The Cleveland Electric Railway has ordered 25 city cars from the Kuhlman Car Co.

The Norfolk & Western has ordered 2,000 hopper cars, 500 box cars and 500 stock cars.

The Charlotte Harbor & Northern is in the market for 25 thirty-ton box cars and 25 thirty-ton flat cars.

The Pittsburgh & Lake Erie is said to be in the market for 1,000 hopper cars. This item is not yet confirmed.

The Fort Dodge, Des Moines & Southern has ordered 25 forty-ton gondolas from the Haskell & Barker Car Co.

The Capitol Traction Co., Washington, D. C., is said to have ordered 30 pay-as-you-enter cars. This is not confirmed.

The Enid, Ochiltree & Western, Ochiltree, Tex., now under construction, will soon be in the market for rolling stock.

The Gilmore & Pittsburgh is said to have ordered 100 gondolas from the Pressed Steel Car Co. This item is not yet confirmed.

The Carolina, Clinchfield & Ohio is said to have ordered a number of all-steel baggage and combination baggage and express cars. This item is not yet confirmed.

The Lehigh Valley has ordered from the Standard Steel Car Co. the 1,000 forty-ton steel underframe box cars mentioned in the *Railroad Age Gazette* of September 17.

The Dominion Iron & Steel Co. has ordered 40 fifty-ton all-steel hopper cars from the Dominion Car & Foundry Co. The capacity of these cars was given as 30 tons in our issue of October 8.

The Seaboard Air Line has ordered three coaches, three combination passenger and baggage cars, four combination mail and express cars and five express cars from the Barney & Smith Car Co., and 1,000 box and 25 stock cars from the Pressed Steel Car Co.

The Pennsylvania, as mentioned in the *Railroad Age Gazette* of October 8, has ordered 96 suburban type, M. P. 54, steel passenger cars, as follows: Thirty-two coaches and 18 combination cars from the American Car & Foundry Co., 30 coaches from the Pullman Co. and 16 coaches from the Standard Steel Car Co.

The Northern Pacific is in the market for the following passenger equipment in addition to the 20 coaches mentioned in the *Railroad Age Gazette* of September 20: Six parlor cars, 9 observation cars, 10 diners, 10 sleepers, 10 tourist sleepers, 6 passenger and baggage cars, 12 mail and express cars and 10 baggage and express cars.

The Atchison, Topeka & Santa Fe has ordered from the American Car & Foundry Co. 1,000 thirty-ton refrigerator cars, as mentioned in the *Railroad Age Gazette* of September 10. The cars are to be 41 ft. 3 in. long and will have wood bodies and composite wood and steel underframes. The following specialties are included:

Bolsters	American Steel Foundries
Brakes	Westinghouse
Brake-beams	Creco
Brake-shoes	National
Brasses	Hewitt
Couplers	Janney
Draft gear	Miner
Journal boxes	Symington
Roofs	Outside flexible metallic
Springs	Simplex

The Atlantic Coast Line has ordered from the Hicks Locomotive & Car Works, for delivery January 1, the six steel-underframe coaches and the four steel-underframe express cars mentioned in the *Railroad Age Gazette* of September 3. It is not in the market for additional ballast cars nor five all-steel passenger cars. The coaches will seat 72 passengers and will weigh about 88,000 lbs. They will measure 60 ft. 5½ in. long, 8 ft. 10½ in. wide and 9 ft. 5 in. high, inside, and 69 ft. 1¼ in. long, 10 ft. ¼ in. wide and 14 ft. 2 in. high, over all. The express cars are of 25 tons capacity and will weigh 85,000 lbs. They will measure 60 ft. 4½ in. long, 8 ft. 10½ in. wide and 9 ft. 5 in. high, inside, and 64 ft. 4 in. long, 10 ft. ¼ in. wide and 14 ft. 2 in. high, over all. The bodies of all cars will be of wood, reinforced with steel, and the underframes will be of steel. The special equipment for both types of car includes:

Axles	5 x 9 M. C. B.
Bolsters, body	Structural steel
Bolsters, truck	Cast steel
Brakes	Westinghouse high-speed
Brake-beams	Waycott special
Brake-shoes	Christie steel back
Brasses	Damascus 5 x 9
Coupler	Janney Buhoup, 3-stem
Curtain fixtures (coaches)	National
Curtain material (coaches)	Pantasote
Door fastenings	A. C. L. standard
Draft gear	Westinghouse friction
Dust guards	Harrison
Heating system	Gold, vapor and direct
Journal boxes	Symington, 5 x 9
Lighting system	Pintsch
Paint	Flood & Conklin
Roofs	A. C. L. std.
Seat covering	A. C. L. std.
Side bearings	Chicago Railway Equipment Co.
Springs	A. C. L. std.
Trucks	Commonwealth cast steel
Vestibules	Pullman
Vestibule diaphragms	R. A. Ajax
Vestibule trapdoors (coaches)	National steel
Wheels	36-in. steel tired, steel centers
Window fixtures (coaches)	Universal (Grip Nut Co.)

IRON AND STEEL.

The Norfolk & Southern has ordered from the Pennsylvania Steel Co. 1,660 tons of 70-lb. open-hearth rail.

General Conditions in Steel.—The particular scarcity in steel is that of semi-finished material. The billet, bar, plate and shape mills are not able to supply the demand of the finishing mills. In pig iron the greatest scarcity is in Bessemer, which has been quoted at $19, with the probability of further increase. There continues to be an active demand for rails and car building material. It is estimated that the earnings of the United States Steel Corporation for October will be nearly $15,000,000. It is believed that the earnings of the corporation for the fourth quarter of the calendar year will exceed those of the third quarter by $5,000,000.

RAILROAD STRUCTURES.

Beech Grove, Ind.—An officer of the Cleveland, Cincinnati, Chicago & St. Louis writes that the plans for building freight and passenger car repair shops which were dropped last year are now being completed. All specifications for the buildings will be held in readiness to begin work as soon as the necessary appropriation is secured.

BRANDON, MAN.—Plans are being made by City Engineer Speakman for a subway to be built under the railway tracks at Brandon, to cost about $100,000.

CLINTON, IOWA.—The Chicago & North Western is contemplating the building of new repair shops.

DULUTH, MINN.—The Minneapolis, St. Paul & Sault Ste. Marie has let the contract to McLeod & Smith, Duluth, for building two freight houses.

FITZGERALD, GA.—The Atlanta, Birmingham & Atlantic has let the contract to Carr & Co., Atlanta, Ga., for a concrete passenger station to cost $10,000.

FORT WILLIAM, ONT.—A contract is said to have been given to J. McDermid & Co., of Winnipeg, Man., for the new Canadian Pacific station at Fort William.

HOBART, OKLA.—The Chicago, Rock Island & Pacific is to build a roundhouse, a water tank and coal chutes.

MONTREAL, QUE.—An officer of the Canadian Pacific writes that the contract is let to Quinlan & Robertson, Montreal, for the substructure of a 1,500-ft., single-track bridge over the Richelieu river between St. John's and Iberville. The bridge will consist of twenty 75-ft. deck plate girder spans and the piers and abutments will be of concrete. Foundations intended to provide for future double tracking will be carried up to the low water line.

NATCHEZ, MISS.—The Natchez & Southern will build a steel bridge over St. Catherine street.

NEW ORLEANS, LA.—An officer of the Illinois Central writes that contracts have been let to the Jefferson Construction Co., of New Orleans, for terminal station buildings in New Orleans, and work was started October 16. There are to be four reinforced concrete buildings on pile foundations with brick end, and fire walls, each building one-story high, 75 ft. by 550 ft. The cost of the improvements, which are being made for the joint use of the Illinois Central and the Yazoo & Mississippi Valley, will be about $300,000. (June 25, p. 1548.)

NORFOLK, VA.—A fire on the morning of October 14 totally destroyed the passenger station, offices and several cars of the Norfolk & Western; loss $100,000.

NORTH YAKIMA, WASH.—The Yakima Valley Transportation Co., Yakima, Wash., has let a contract to O. L. Hanson, Kennewick, Wash., for trestles over the Yakima river and the Cascade Lumber Company's mill pond. Work is to begin at once.

PHILADELPHIA, PA.—An officer of the Baltimore & Ohio writes that contracts have been recently let for a large amount of structural steel. This is for bridges on the Philadelphia division, including the Schuylkill river, also for the 200-ft. rolling lift bridge at Cleveland, Ohio, and for smaller bridges at various points on the road.

PINE BLUFF, ARK.—Permits to bridge the Arkansas river have been petitioned for by the Memphis, Paris & Gulf and the Arkansas, Louisiana & Gulf.

RENO, NEV.—Officers of the Nevada-California-Oregon are quoted as saying the company will build a new general office building at a cost of $25,000. The building is to be of brick and two stories high.

SAVANNAH, GA.—The Atlantic Coast Line is to build two subways at a cost of $20,000.

SPRINGFIELD, OHIO.—Preliminary work has been begun by the Cleveland, Cincinnati, Chicago & St. Louis on a new passenger station. (Oct. 2, 1908.)

TACOMA, WASH.—The Chicago, Milwaukee & Puget Sound has been granted building permits by the city for eight buildings, as follows: A 12-stall roundhouse, wood-working, blacksmith and locomotive machine shops, a coal shed, storehouse, sand storage house and employees' building. The total estimated cost of the buildings is given as $67,450.

WALLACE, IDAHO.—The Oregon Railroad & Navigation Co. is planning to rebuild the roundhouse which was destroyed by fire several months ago.

WAYCROSS, GA.—The Atlantic Coast Line has prepared plans for a brick passenger station.

Supply Trade News.

A. D. McAdam resigned his position with the Damascus Brake Beam Co., Cleveland, Ohio, on October 15.

The Norfolk & Southern has bought from Fairbanks, Morse & Co., Chicago, 16 No. 14 motor cars for use by section men instead of hand cars.

The United States Steel Corporation has announced that plans are again under consideration for the proposed steel plant at Duluth, Minn.

Frank Perry has been appointed general purchasing agent for the Scullin-Gallagher Iron & Steel Co., St. Louis, Mo., succeeding Logan Zintgraff, resigned.

The Isthmian Canal Commission asks bids up to November 8 on steel angles and sheets, lag screws, bolts, sight feed lubricators and miscellaneous supplies. (Circular No. 539.)

The Forsyth Brothers Co., Chicago, announces the removal of its sales department to the home office, 213 Institute place, and requests that all communications be sent to this address.

W. E. Robinson, formerly assistant general freight agent of the Canadian Pacific at Vancouver, B. C., has been appointed sales manager of the Gillis Supply Co., Limited, with office at Vancouver.

A. L. Whipple, heretofore sales manager of the Forsyth Brothers Co., Chicago, has formed the Whipple Supply Co., 50 Church street, New York. He will handle several specialties for both steam and electric railways.

W. H. McBride, formerly contracting freight agent of the Chicago, St. Paul, Minneapolis & Omaha, with office at St. Paul, Minn., has taken a position with the Patterson Sargent Company, Cleveland, Ohio, wholesale paint dealers. His office will be in St. Louis, Mo.

The Lehigh Valley Coal Co. recently placed orders with the Vulcan Iron Works, Wilkesbarre, Pa., for a 7-in. x 12-in. saddle-tank oil-burning locomotive and a 7-in. x 12-in. double-tank compressed air locomotive. These locomotives are intended for inside mine service.

Dumont Clarke, president of the American Exchange National Bank, has been elected a director of the American Locomotive Co., New York, succeeding R. J. Gross. James McNaughton, vice-president, has been elected a director to fill out the term of Joseph Bryan, deceased.

W. S. Howe, formerly advertising manager and in charge of the small tool sales department of the Canadian-Fairbanks Co., Ltd., Montreal, Que., has become associated with the S. A. Woods Machine Co., Boston, Mass. Mr. Howe was with the S. A. Woods Machine Co. for about 10 years previous to his entrance into the Canadian field.

James E. Bough has withdrawn from the firm of A. V. Kaiser & Co., Philadelphia, Pa., where he had an interest and had been manager for the past 10 years. He has formed the Pennsylvania Equipment Co., West End Trust building, Philadelphia, and will deal in railway and contractors' equipment, also new and second-hand machinery of all kinds.

The following have been elected directors of the Westinghouse Air Brake Co., Pittsburgh, Pa., other directors being re-elected: Henry C. Bushman, president of the Second National Bank of Pittsburgh; Charles McKnight, president of the National Bank of Western Pennsylvania, and Horace E. Smith, of the banking house of Charles Smith & Sons, Philadelphia, Pa.

A special meeting of the Bethlehem Steel Corporation is to be held November 5 to authorize the pledging of securities of the subsidiary companies to secure $7,500,000 6 per cent. five-year notes of the Bethlehem Steel Co., South Bethlehem, Pa. A third of the proceeds of this issue is to be used for retiring outstanding notes, and the remainder for erecting three new blast furnaces, one of which is now under construction, and 10 open-hearth furnaces, or in some other way increasing the steel capacity; also a new structural mill and minor improve-

ments. Arrangements for the sale of the notes have already been made.

Work was begun in August on the first locomotive ever built in Chile, at the works of the Sociedad de Maestranzas y Galvanizacion in Valparaiso. This is the first of an order for five engines to be built for the Chilean Government railways. A duplicate order has been placed with Balfour, Lyon & Co., on which work is to be begun soon. It is understood these locomotives are to cost the Chilean government at least 20 per cent. more than it would cost to import similar locomotives, but it is in line with a policy to encourage the industrial development of the country. Orders for freight cars may follow.—*Consular Report.*

MACHINERY AND TOOLS.

The Norfolk & Southern has bought a 100-ton wrecking derrick.

The Seaboard Air Line has ordered one 50-ton steam wrecking car from the Pressed Steel Car Co.

The Pullman Co. has ordered from the Allis-Chalmers Co. Milwaukee, Wis., two steam turbines and generators, aggregating 5,000 h.p., together with auxiliary apparatus.

A special agent of the Department of Commerce and Labor, who has been making an investigation in Russia, is quoted as saying that Russia is in need of machinery and machine tools, and that American firms should be able to build up a profitable Russian business.

TRADE PUBLICATIONS.

Bolts, Etc.—The Kansas City Bolt & Nut Co., Kansas City, Mo., has issued a 40-page catalogue of its bolts, nuts, rivets and screws.

Drills.—A folder issued by the Cleveland Twist Drill Co., Cleveland, Ohio, is entitled The Paragon Way. It gives sizes and price lists of No. 930 high-speed flat twist drills, with Paragon flat taper shanks. It also lists Paragon sockets.

Oil Burners.—A folder issued by the Hauck Manufacturing Co., Brooklyn, N. Y., describes oil fuel burners for foundry uses. It is illustrated with photographs of burners in use for cupola lighting, ladle drying, repairing of castings, skin drying molds and baking molds.

Water Treatment.—The Dearborn Drug & Chemical Works, Chicago, has published a souvenir booklet on water treatment. It describes the company's plant and processes, and discusses water treatments suitable for various classes of boilers. The illustrations, of which there are many, are particularly good.

Street Railways.—An attractive souvenir book entitled Tour of the Massachusetts Street Railway Association, October, 1909, was prepared by the Stone & Webster Engineering Corporation, Boston, Mass., for use by members of the association, which is making a tour throughout the country. The book furnishes data regarding each of the cities visited, particularly concerning the street railways.

Lifting Magnets.—The Electric Controller & Manufacturing Co., Cleveland, Ohio, has published a new catalogue describing its various types of lifting magnets. It has 61 pages, with many illustrations showing magnets in use in a variety of operations. The S. A. lifting magnet is made in various sizes, the diameter of the face being from 36 in. to 61 in. Capacities, depending on the character of the material handled, run up to 50,000 lbs.

Signals.—Bulletin No. 42 of the Union Switch & Signal Co., Swissvale, Pa., describes the Union electric semaphore equipped with style S mechanism. This style is a development of the style B signal, adapted to meet the requirements of three-position signals. While this mechanism may be used with two-position signals a variation of it is made arranged for a two-position movement alone.

Bulletin No. 43 is devoted to facing point switch and passing siding protection. It is illustrated with drawings and diagrams showing the interlocking arrangements.

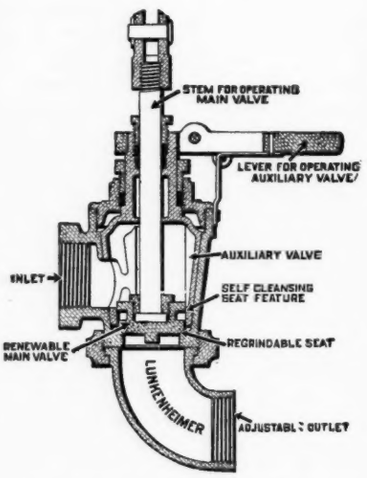
Electrical Apparatus.—A number of bulletins have recently been issued by the General Electric Co., Schenectady, N. Y., dealing with electrical apparatus of various types. Bulletin No. 4,694 is on portable substations for electric railways; No. 4,676, multiple enclosed arc lamps; No. 4,687, direct-current motor-starting rheostats; No. 4,699, motor-driven air compressors for freight equipment; No. 4,700, switchboard instruments; No. 4,681, panel boards; No. 4,698, luminous arc headlights for street railways; No. 4,682, oil break switches for machine tools; No. 4,701, emergency straight air-brake system for electric railways. Bulletin No. 4,692 describes the G.E. 210 65-h.p., 600-volt railway motor, and bulletin No. 4,693 the G.E. 88, 40-h.p., 500-volt railway motor. These are the latest types of apparatus of these classes and capacity. Bulletin No. 4,691 describes motors for use with smaller machines in machine shops. These include single-phase and polyphase motors, which can be used in either horizontal or vertical positions. They are furnished in sizes from ⅛ h.p. to 15 h.p.

Plate Glass.

The important railways of the country are using plate glass in their passenger coaches to a greater degree than in past years. When one considers the vast sums expended on passenger equipment for the purpose of safety, appearance and comfort, it is not surprising that plate glass should now be looked upon as a necessity.

Locomotive Blow-Off Valve.

The accompanying drawing shows a new form of blow-off valve, made by the Lunkenheimer Co., Cincinnati, Ohio. This valve is operated by hand, and is designed to eliminate all tendencies to fouling, sticking or leaking, and be at the same time positive in every action. In this valve there are two distinct valves within a single body; one of these is for regular use, while the other is provided for emergency service, to be operated only in case of possible failure of the main valve. This emergency provision is the means of avoiding considerable annoyance and expense caused by blow-off valves constructed with but one valve, no provision being made for emergency.



Lunkenheimer Blow-Off Valve.

The construction of the main valve is clearly shown in the sectional drawing. The emergency feature, for use in case of possible failure of the main valve, is provided in the key or taper plug valve, made a ground fit in the body, and operated when required by rotation of the lever handle. Ordinarily, this emergency key remains in open position, as shown, giving free passage through from the inlet to the main valve. Should the latter leak or give trouble in any respect, preventing its tight closing, the key may be rotated to close the opening from the inlet. Then the main valve is raised to its extreme open position and all blowing-off operations performed by manipulation of the emergency valve. The main valve should be restored promptly to working condition, so as to release the key plug for its intended function as an emergency feature.

Stuffing-boxes insure against leakage around the stem of the main valve or the neck of the emergency key. The emergency valve lever handle is held firmly in either open or closed position by the spring shown, which engages suitably placed notches in lugs on the body.

Immediately above the main valve disc is formed a flange, guided by ribs as the valve is raised and lowered, and providing for positive cleaning of the seat as the valve is closed. This flange fits loosely within the key, being a few thousands of an inch smaller in diameter. When, therefore, the lower edge of the flange approaches and passes the edge of the key opening, there is caused a gradual wire-drawing of the escaping water, more and more of which bursts at once into steam, and, by its high velocity, becomes quite effective in washing away any sediment which may have collected on or near the seat. Absence of this provision in other valves is claimed to be

a prime cause of trouble, the sediment preventing proper seating of the disc and allowing slight leakage, which rapidly increases as the resultant cutting action progresses. Serious injuries, also, are often caused by attempts to close tight a blow-off valve upon whose seat has lodged a piece of boiler scale or other hard substance, thus possibly ruining both disc and seat. Should a piece of boiler scale become lodged in the opening and prevent closure of the main valve, it may generally, by a partial turn of the emergency key, be so broken up as to pass out in fragments when the key is returned to open position. Practical service has shown several points of peculiar advantage attributed entirely to the double character of this blow-off valve. It can also be reground readily should the seat become worn. As all parts of the valve are made to standard gages and templets, any worn out or broken part can be quickly renewed. Avoidance of contracted areas is a characteristic of this valve, the passages being at all points fully equal to the connecting pipe. Thus the flow of water is entirely free and quite direct. Should the water in the boiler of a locomotive foam while on the road, the engineer or fireman can open the blow-off by reaching out on the running board to the operating lever there located.

The Boston & Maine has adopted this valve for use in connection with its ash-pan equipment, because of its durability and dependency. The makers claim that the material used is of the very highest grade of bronze composition, thereby insuring the maximum of strength and durability.

New Safety Locomotive Ash Pan.

The locomotive ash pan illustrated herewith, which is designed to meet the requirements of the Federal law that goes into effect next January, has been in use on the New York, Chicago & St. Louis for a year, and was adopted by that road as standard last May. The novel feature is the provision of scrapers in the ash pan, operated by levers in the cab, which move back and forth under guides in each section of the pan. Provision is also made for operation of the scrapers from the ground.

The portion of the pan in which the scrapers move is made of cast iron and is suspended from the firebox by a sheet iron skirt attached to the mud ring. For cold climates the pan is surrounded on three sides by a heater—spaces into which steam can be admitted from suitably placed pipes should water in the pan cause freezing. The scraper plate in this arrangement is removable and slides in and out between guides. Air is admitted to the ash pan at the ends above the dampers, or it can be taken in at the top by extending the pan beyond the end of the firebox.

A test was made recently in Chicago to determine the time for cleaning an engine equipped with this pan. It was an 18 in. x 24 in. passenger locomotive, with a deep firebox and an ash pan 11 in. deep. After coming in from its run it was allowed to stand over night without disturbing the fire. In the morning a hostler cleaned it from the cab in six minutes, the contents of both firebox and ash pan being dumped into the ash pit. The Nickel Plate engine which has had the pan for a year was taken into the shops for general repairs about the first of July. Although it had been running in the pool the larger part of the time, no repairs to the pan were necessary beyond the renewal of a fulcrum pin and the taking up of some lost motion.

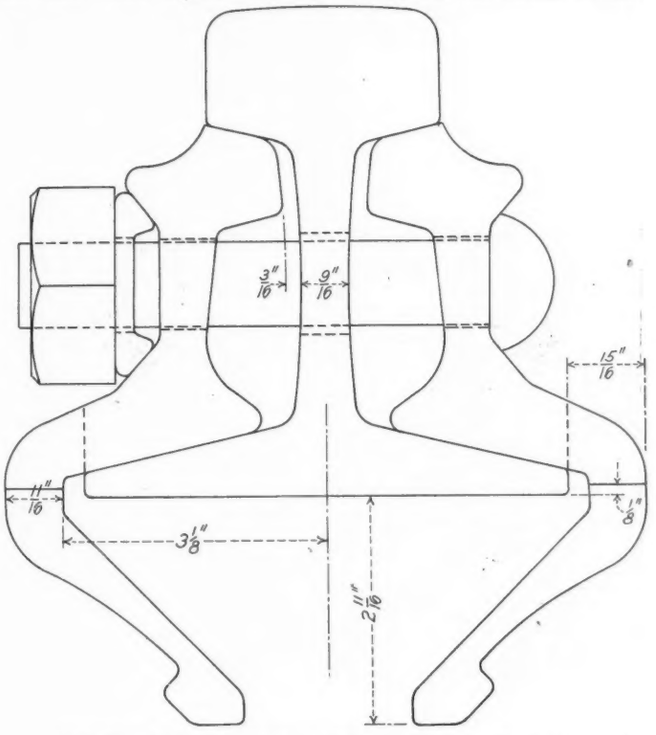
In addition to the advantages already set forth, it is claimed that the pan promotes despatch in handling power at terminals and on the road; that it improves the steaming qualities of the boiler by enabling a clean fire to be kept, lengthening the life of the flues and adding to the efficiency of the locomotive; that by prevention of the accumulation of ashes and partly burned fuel in the ash pan it assures longer life to the latter as well as to the grates; that its fire-tight bottom prevents the dropping of fire on the track; and that it is adapted to any type of locomotive.

In addition to the Nickel Plate, the Burlington has one pan on trial and the Chicago Junction has two. The Chicago & Alton, the Big Four, the Minneapolis & St. Louis, and the Belt Railway of Chicago will put the pans in trial service. The Atlas Safety Locomotive Pan Co., Ft. Wayne, Ind., has been formed to put the device on the market.

100 Per Cent. Joint.

The accompanying drawing shows a cross section of the 100 Per Cent. rail joint made by the Cambria Steel Co., Philadelphia, Pa.

This design shows a great development of the upper member for the purpose of taking care of the upward wave movement of the rail at the joint. This upward movement, in reversing the strains in the joint, puts the upper member under a tensile strain, instead of compression, as is the case when the load is directly over the joint

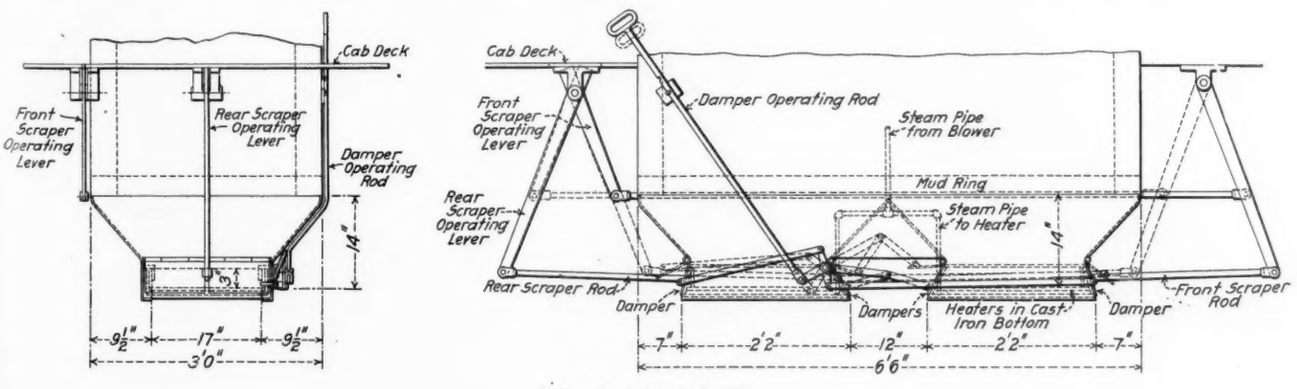


100 Per Cent. Joint for 100-lb. A. S. C. E. Rail.

The design also takes ample care of the buckling point at the junction of the vertical and middle members, which is necessary to secure full value from the depending flange.

A laboratory test of this joint applied to 100-lb. A. S. C. E. rail on 20-in. supports shows that it withstands a load of 150,000 lbs. at the elastic limit; when the joint is tested inverted, applying the load on the bottom of the rail, the elastic limit is only 13 per cent. less than when tested in the natural position, thus proving the great value of the reinforced upper member. The washer is made of spring steel and bowed crosswise, thus fulfilling the two-fold purpose of washer and nut lock.

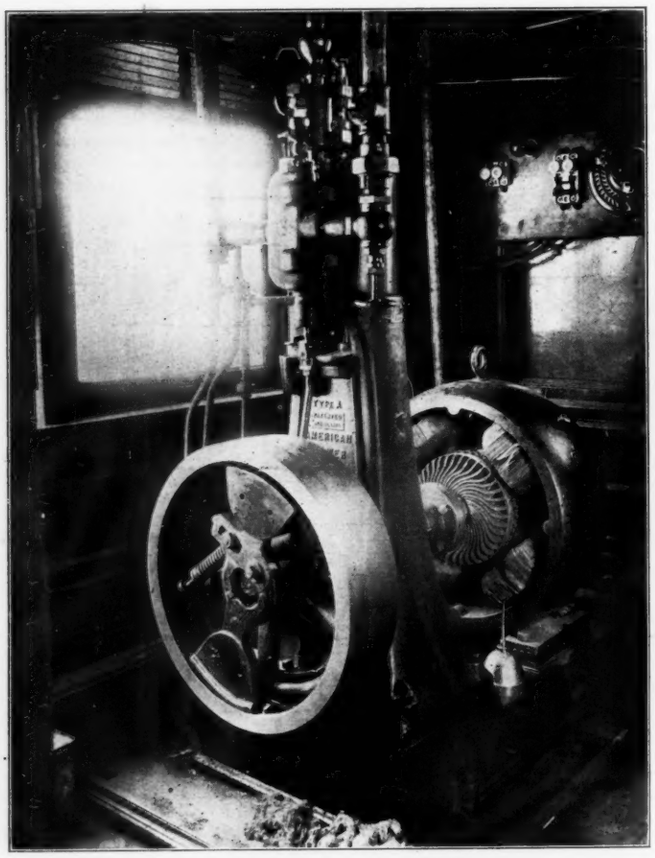
A similar joint, oil-treated, showed the elastic limit to be over 200,000 lbs.; this being the limit of the machine, the exact limit could not be definitely determined.



Atlas Safety Ash Pan.

Train Lighting Set.

The American Blower Co., Detroit, Mich., had a train lighting generating set running at its exhibit at the mechanical conventions at Atlantic City last June. The A B C vertical engine, it is claimed, is entirely



Train Lighting Set.

closed and self-oiling to such a degree that it is not necessary to fill the base with oil oftener than once in about three months, the outfit requiring adjustment at no more frequent intervals and there is no oil cup on the engine requiring attention. These points, together with the fact that it is silent in operaion, would seem to make it desirable and economical for railway train lighting.

The accompanying photograph shows a set used on the Salt Lake & Los Angeles. A similar set is in operation on the Salt Lake & Ogden. The outfit consists of a 4-in. x 4-in. A B C engine and a 4.25-k.w. d.c. generator, 115 volts, 700 r.p.m., made by Fairbanks, Morse & Co., Chicago. It is located in the baggage car, the steam being taken from the boiler of the engine at from 40 to 50 lbs. pressure. The average number of lights is about thirty 16-c.p. lamps and one arc headlight. Both outfits have been operated in an entirely satisfactory manner, and the noise is hardly appreciable. The only thing is a slight vibration in the baggage car. These outfits are given hardly any attention, and the Fairbanks firm has never had occasion to send a man to repair or fix any trouble arising from them.

Cast Steel Rail Joints.

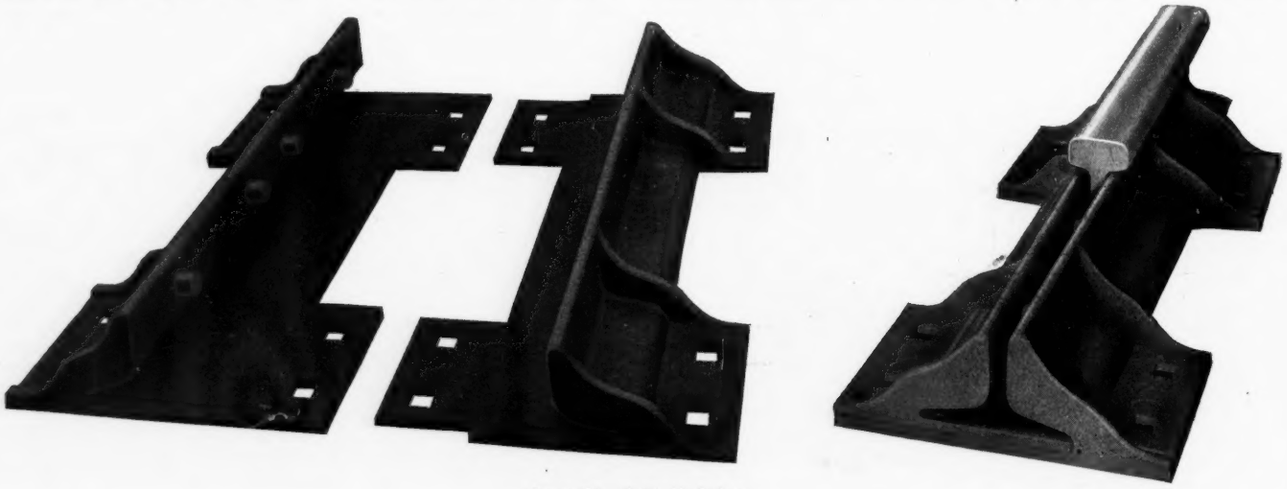
The Pittsburgh Equipment Co., Pittsburgh, Pa., has organized a new company to handle track specialties. This is the Pittsburgh Track Specialty Co. It will make cast-steel rail joints, tie plates, such poles and posts as can be made of cast steel, also cast-steel ties, with plain or insulated bearings for the rails, and such other track equipment as may be developed.

The rail joint, shown herewith, can be made to be used either with or without bolts. It is shown here without bolts, but it can just as easily

Insulated Joint.

be made to take the ordinary track bolts instead of the lugs. As shown, the base is formed of two plates, which overlap, and the spikes, engaging holes in both the upper and lower plates, hold the joint firmly in place. The joint can be modified so as to be a supported joint, the joint being directly on a tie, instead of the suspended or two-tie joint shown. The development of processes of making cast steel has made it possible now to make rail joints of cast steel and sell them in competition with rolled joints.

The insulated joint shown herewith is in service on the Pittsburgh & Lake Erie, near Glassport, Pa. It was put in at a particularly troublesome point. The joints formerly in place had been wearing out



Cast Steel Rail Joint.

the insulation in as short a time as four days, and a maximum time of twelve days. The new joint was put in last February and the insulation has not been changed since. The particular advantage of the use of this design for insulated joints lies in the fact that since the joint supports the rail on the base, the insulation is not subject to shear under the head of the rail.

ANNUAL REPORT

SOUTHERN RAILWAY COMPANY—FIFTEENTH ANNUAL REPORT.

Washington, D. C., October 8, 1909.

To the Stockholders of the Southern Railway Company:

The Board of Directors submit the following report of the affairs of the Company for the year ended June 30, 1909:

INCOME STATEMENT.

	1909.	1908.	Increase or Decrease	
Miles of Road Operated, Average	7,170.36	7,489.13	Dec.,	318.77
Gross Operating Revs.	$52,188,106 64	$52,941,716 51	Dec.,	$753,609 87
Total operat'g Expenses	35,568,980 60	39,854,722 13	Dec.,	4,285,741 53
Net Operat'g Revenue	$16,619,126 04	$13,086,994 38	Inc.,	$3,532,131 66
Outside Operations	136,963 39	21,262 65	Inc.,	115,700 74
Net Revenue	$16,756,089 43	$13,108,257 03	Inc.,	$3,647,832 40
Taxes Accrued	1,916,701 65	2,027,967 35	Dec.,	111,265 70
Operating Income	$14,839,387 78	$11,080,289 68	Inc.,	$3,759,098 10
Other Income	2,898,311 70	2,766,676 86	Inc.,	131,634 84
Total Gross Income	$17,737,699 48	$13,846,966 54	Inc.,	$3,890,732 94
Deductions from Total Gross Income	$3,060,583 21	$3,134,341 81	Dec.,	$73,758 60
Interest on Funded Debt and Equipment Obligations	11,087,730 85	10,310,774 80	Inc.,	776,956 05
Total Deductions	$14,148,314 06	$13,445,116 61	Inc.,	$703,197 45
Balance of Income over Charges	$3,589,385 42	$401,849 93	Inc.,	$3,187,535 49
Addit'ns & Betterments	78,285 18	122,707,37	Dec.,	44,422 19
Balance carried to Credit of Profit and Loss	$3,511,100 24	$279,142 56	Inc.,	$3,231,957 68

A statement of the accounts of the Company, in the usual detail, will be found in the tables hereto annexed.

The accounts have been examined, as usual, by Certified Public Accountants, Messrs. Patterson, Teele & Dennis, and their certificate is made a part of this report.

THE OPERATING RESULTS.

The return of business from the low level of the panic conditions of 1907 was slow during the past year, but it was substantial.

While the operating revenues, as stated in the income account, show an apparent decrease of $753,609.87, as compared with the year ended June 30, 1908, this is due to the fact that the revenues from operation of the Tennessee Central Railroad and the Southern Railway in Mississippi were included last year and both these properties have been separately operated during this year. Comparing like with like, the results of operation show increased operating revenues amounting to $606,766.46 for this fiscal year. The gross operating revenue per mile of road was $7,278.31 in 1909, or just about what it was in 1906, as compared with $7,228.00 in 1908, and $7,507.49 in 1907, when the volume of the Company's traffic was greatest. A just estimate of the improving condition of the Company's business during this year can better be obtained by comparing the operating revenues for the first six months of the calendar years 1908 and 1909, which show an increase of $2,326,107.20 for this year.

Although the volume of business done was thus not unsatisfactory, the results of operation, illustrated by the substantial increase of $3,786,893.56 in operating income, were obtained, it will be evident, by control of operating expenses.

The study and practice of operating efficiency, which were initiated in the winter and spring of 1908, as described in the last Annual Report, were vigorously pursued during the year now under review and with gratifying results. It will be noted that the operating ratio, excluding taxes, was reduced from 74.79 in 1908 to 68.16 in 1909; or, to state the result differently, while operating revenues increased 1.18 per cent., operating expenses decreased 7.80 per cent. That the chief element in this result is efficient operating methods, as illustrated by the fact that of the total decrease in operating expenses 55.70 per cent. was in transportation expenses, continues to be a ground of encouragement to the management.

What this progress is can perhaps best be realized by a few statistics dealing comparatively with some operating units, viz.:

	1908.	1909.
Total transportation costs per revenue train mile, in cts.	62.66	60.75
Road engine costs per road engine mile, excluding repairs, in cents	22.49	20.41
Train expenses per revenue train mile, in cents	9.93	9.21
Loaded cars per revenue freight train mile	13.46	15.19
Tons handled per revenue freight train mile	232.33	266.40

Particular attention has been paid during the past year to removing the causes for loss and damage claims, which, with all railroads, are so heavy a tax on net revenue. That success in work of this kind means as much to the security holders as the establishment on the line of new traffic producing industries of the largest capacity, is evidenced by the fact that the disbursements for loss and damage claims in 1909 were at least $800,000 less than in 1908, and in neither year were there any extraordinary losses. The saving was in the sum of small losses due to greater care in handling freight and more efficient service.

It will be noted that the charges to expenses in the maintenance accounts show material reductions as compared with 1908, but the upkeep of the property has not been neglected. The figures for 1908 contain comparatively large charges to maintenance accounts during the last six months of the calendar year 1907, before the campaign of retrenchment was begun, while the expenses for maintenance during the entire fiscal year just ended have been controlled through monthly appropriations under the policy which was inaugurated during the first six months of the calendar year 1908. This policy has been one of acute and careful scrutiny of all expenditures for operating account. Money has been authorized to be spent where it was needed, and not necessarily where it would have been a gratification to spend it. It has taken courage to maintain this policy, but it is confidently believed that the result has justified it. While some maintenance has been postponed until increased revenues shall warrant the expenditure, this has been only in respect of those parts of the property where deliberate and expert judgment justified postponement upon the real necessities of the case. The general condition of the physical property at the close of the fiscal year was good, both actually and comparatively, and the plant was at all times during the year amply able to carry the load which it had to bear. With the expectation of increased business, and consequently heavier traffic, the appropriations for maintenance have been materially increased, and so at all times the policy of the management has been one of elastic adjustment to the actual requirements of the property, but with unremitting watchfulness of the factors of safety and efficiency.

THE CAPITAL ACCOUNT.

What may be considered the immediate financial problem of the Company has been the absorption of the several issues of short term notes, which were made to provide for the extraordinary capital obligations assumed during the period of great prosperity, when, as explained in previous reports, the problem of management seemed to be entirely one of judicious expansion. During this year the $16,000,000 of Collateral Trust Five Per Cent. Bonds which were issued in 1904, matured and were redeemed by the sale of Development and General Mortgage Bonds which had been reserved for that purpose under the general plan of the mortgage. Later in the year it became possible to sell more of such bonds on fair terms, and advantage of the market was taken to provide for the retirement also of the $15,000,000 Three-Year Convertible Six Per Cent. Notes, which were not due until 1911. The proceeds of the Development Bonds which were pledged as security for the Six Per Cent. Notes were accordingly applied to their redemption and the notes were called, a part of them being paid off on May 1, 1909, and the remainder will be paid off on November 1, 1909. In this way $31,000,000 of temporary obligations of the Company were permanently funded, and while the funded debt was increased, the fixed charges of the Company will be decreased $96,680 per annum by these operations. A further reduction in fixed charges has been effected by the acquisition of a number of underlying Six Per Cent. Bonds against the issue of First Consolidated Mortgage Five Per Cent. Bonds sold at a premium. In this connection, the effect upon the capital account and the fixed charges of the redemption of equipment obligations to the extent of $3,090,103.73 during the year is important

CONSTRUCTION.

During the year much of the construction work which was suspended in the summer of 1907 was resumed, and substantial progress has been made towards the completion of some very desirable facilities. The principal work has been in the provision of additional double track at the points where the capacity of existing single track has been overtaxed, as was explained in detail in the Annual Report of 1907.

Of this work the revision of grade and double tracking of the main lines south from the terminal yard at Monroe, Virginia, across the James River, through the city of Lynchburg and thence across the Staunton River to Sycamore, Virginia, a total distance of 38.14 miles, shortening the old line 2.16 miles, is perhaps the most important. A portion of this new double track from Durmid to Sycamore, 30 miles, has been in operation since April 30, 1909; the remainder, involving the construction of a notable viaduct over the James River and a tunnel 1,300 feet in length under the city of

Lynchburg, is heavier work, but should be available for operation in the spring of 1910.

The throat through which the Knoxville and Atlanta lines, which converge at Ooltewah Junction, Tennessee, reach the city of Chattanooga, is another piece of line where double track has long been needed. The work on this 14 miles was resumed during the year and is being pushed to completion.

Other pieces of double track out of terminals are also under construction, viz.: 2.63 miles north out of Greensboro, N. C., and 4.4 miles west out of Asheville, N. C.

Since the close of the fiscal year contracts have been let for the construction of second track on the main line in North Carolina, from Spencer south to Glass, 18.70 miles, and from Charlotte north to Harrisburg, 13.60 miles, and these works being comparatively light should be completed by January 1, 1910.

When the expected increase in the volume of traffic is realized with the return of business prosperity, the Company will have in all 323.57 miles of double track at its "pinch" points, and should be able to handle its business without congestion or disturbance, largely by reason of the relief so afforded.

During the year portions of the projected low grade Little Tennessee River line, connecting Knoxville with the Carolinas, upon which work was begun several years ago, were also completed and put in operation, viz.: 25.30 miles from Maryville to Chilhowee, Tenn., which was constructed in the name of the Tennessee & Carolina Southern Railway Company, and 13.90 miles from Bushnell to Fontana, N. C., which was constructed in the name of the Carolina & Tennessee Southern Railway Company. These lines are operated for local service, but it is not proposed immediately to push the work through. The present construction policy of the Company is to apply its capital resources to enlarging the capacity and facilities of its existing lines, where a heavy traffic is assured, rather than to exploit new territory or hazard new lines.

CHARACTERISTICS OF FREIGHT TRAFFIC.

Freight traffic handled during the year, in the order of its tonnage volume, may be grouped in the following manner:

Commodity.	Tons.	Per cent.
Fuel—Coal, Coke and Charcoal	7,190,263	32.49
Forest Products—Lumber, etc.	3,818,411	17.25
Stone, Cement, Brick, Sand and like materials.	2,075,270	9.38
Merchandise	1,980,661	8.95
Manufactures and Miscellaneous, not otherwise classified	1,768,374	7.98
Cotton and all its products	1,571,339	7.10
Grain, Grain Products and Hay	1,100,413	4.97
Fertilizer	964,241	4.36
Iron, Steel and Machinery	823,586	3.73
Ores and Clays	423,418	1.91
Perishables	310,190	1.40
Petroleum	107,223	.48
Total	22,133,389	100.00

More than 70 per cent. of this tonnage was produced in the South, in the main on this Company's rails. No better evidence could be had of the independent position of this property.

The tonnage increase per mile of road during 10 years has been 42 per cent., marking the development of productive energy and of territorial resources.

Nearly one-third of the traffic was coal, originating chiefly on the Company's lines.

Another third consisted of manufactured articles, ready for immediate use, a substantial share of which were manufactured in the South from Southern raw materials.

The tonnage of lumber and logs embraced a great variety, including mahogany, Spanish cedar and shittim wood. Much of this tonnage found distribution in numerous wood-working establishments on the Company's lines, and was converted into furniture, store fixtures and all the various kinds of house furnishing materials.

The year was a dull one for iron and steel. The tonnage in pig and blooms was 100,528 tons less than ten years previous; that of iron and steel manufactures 188,051 tons greater. Sixty per cent. of the pig metal and *all* the billets produced in the South are manufactured in that section.

The South is no longer a mere producer of raw materials.

Serving most of the cotton producing States directly, and the remainder of them indirectly, with its lines touching five of the chief ports through which cotton passes to both foreign and domestic markets; serving directly a substantial majority of the spinning enterprises of the South, this railway is naturally a large (probably the largest) carrier of the South's chief agricultural product—cotton. The Company handled during the year 636,207 tons, or more than 2,500,000 bales, of the fleecy staple, including the movement to various primary markets in the South and the subsequent movement from these markets to points of consumption. Yet this important traffic constituted less than 3 per cent. of the total tonnage for the year.

It is a fact, not generally known, that for each pound of lint cotton produced there are approximately two pounds of seed, the manufacture of which has become a Southern industry of great magnitude, affording a substantial freight tonnage.

The textile industry in the South took 2,353,873 bales, or over 18 per cent., of the last cotton crop—to be spun and wove in Southern factories. This Company handled during the year 61 per cent. of the manufactured product.

Therefore, to fully appreciate the importance to the Company of cotton, account should be taken also of its kindred tonnage, as indicated by the following table:

PRODUCTS.	TONS.
Cotton	636,207
Cotton Seed	244,563
Cotton Seed Hulls, Meal and Cake	238,244
Cotton Seed Oil	122,511
Cotton Bagging and Ties	29,627
Cotton Factory Products	329,814
Total	1,600,966

or 7.23 per cent. of the total tonnage.

It is worthy of note that the tonnage of merchandise traffic exceeds the tonnage of cotton and its entire products, and that he combined tonnage of merchandise, manufactures and miscellaneous articles, furnishing practically 17 per cent. of the total tonnage, was exceeded only by tonnage of fuel and forest products. These facts are more interesting when it is known that the merchandise, manufactures and miscellaneous articles produce the highest revenue results and are subject to the keenest competition.

INDUSTRIAL PROGRESS.

The industrial South has not been stagnant despite the business depression. On the lines of this Company there were completed during the year 453 new manufacturing plants, classified as follows:

Brick Works	40
Cotton Seed Oil Mills	11
Fertilizer Works	7
Flour and Feed Mills	25
Furniture Factories	18
Iron Industries	23
Lumber Mills	67
Stone Quarries, Coal and other Mines	36
Tanneries	1
Textile Mills	48
Woodworking Plants	18
Miscellaneous Plants	159
Total	453

The number of industrial plants under construction at the close of the year was 66, and the number of additions made to existing plants during the year aggregates 123.

There are now at least 10,000 manufacturing plants on the lines of this Company. It is a very few years since there were not that many in the entire South.

THE GREATER EFFICIENCY OF LABOR.

More than conventional acknowledgments are due by the Board and the security holders to the officers and employees of the Company for their work during the past year. Not only have they been faithful in the discharge of their assigned duties, but they have been infused with a new spirit of enthusiasm in the interests of the Company, which are indeed their own interests. Co-operation between departments has been marked, while never before has there been such evidence of the loyalty of employees in all ranks of the service. This is the fruit of that greater efficiency of labor upon which there cannot be laid too serious stress in estimating the results already obtained and the prospects for the future..

Respectfully submitted, by order of the Board,

W. W. FINLEY, *President.*

PROFIT AND LOSS ACCOUNT FOR YEAR ENDED JUNE 30, 1909.

Balance at Credit of this Account June 30, 1908		$5,791,185 22
Add:		
Credit Balance of Income for the Year	$3,511,100 24	
Net Miscellaneous Credits	846,222 35	
		4,357,322 59
		$10,148,507 81
Deduct:		
Discount on Bonds charged to Profit and Loss during the Year		3,186,500 00
Credit Balance June 30, 1909		$6,962,007 81

COMPARATIVE BALANCE SHEET, JUNE 30, 1909, AND JUNE 30, 1908.

JUNE 30, 1908.	ASSETS.	JUNE 30, 1909.
	COST OF ROAD:	
$293,856,032 96	Cost of Southern Ry. Properties to June 30, 1908	$293,856,032 96
.....	Additions during the year	1,797,973 89
$293,856,032 96	TOTAL COST OF ROAD	$295,654,006 85
	COST OF EQUIPMENT:	
$29,637,600 62	Cost of Southern Ry. Equipment to June 30, 1908.	$29,637,600 62
.....	Cost of Equipment charged to Capital during the year	2,218,012 51
$29,637,600 62	TOTAL COST OF EQUIPMENT	$31,855,613 13
	Leasehold Estates:	
$30,808,607 31	Road	$30,808,607 31
1,540,392 69	Equipment	1,540,392 69
$32,349,000 00	TOTAL LEASEHOLD ESTATES (*Per Contra*)	$32,349,000 00
17,565,266 80	SOUTHERN RAILWAY TRUST EQUIPMENT (*Per Contra*)	14,475,163 07
$373,407,900 38	TOTAL COST OF ROAD, EQUIPMENT AND LEASEHOLD ESTATES	$374,333,783 05
	COST OF SECURITIES PLEDGED OR HELD FOR SPECIAL PURPOSES:	
$13,306,634 97	Pledged under First Consolidated Mortgage	$13,306,634 97
3,347,088 06	Pledged under Development and General Mortgage	20,296,872 21
61,238,702 65	Pledged or deposited under various Indentures	23,313,703 20
7,640,925 05	Unpledged, held for special purposes	10,774,697 05
$85,533,350 73		$67,691,907 43
.....	Special Deposit with Financial Agent to redeem on November 1, 1909, Convertible 6 Per Cent. Notes, due May 1, 1911; total	11,105,000 00
$458,941,251 11	COST OF ROAD, EQUIPMENT AND SECURITIES HELD AS STATED	$453,130,690 48
$3,463,507 33	MATERIAL AND SUPPLIES ON HAND	$3,995,255 50
365,871 61	RAIL AND FIXTURES LEASED	380,212 41
$462,770,630 05	TOTAL CAPITAL ASSETS	$457,506,158 39
1,044,921 24	MISCELLANEOUS SECURITIES OWNED—in Treasury Unpledged.	4,015,569 88
1,403,970 68	BILLS RECEIVABLE—deferred but secured	595,479 68
1,362,035 04	ADVANCES TO SUBSIDIARY COMPANIES.	925,622 31
160,531 63	INCOME ACCRUED—not due	473,572 80
377 45	INSURANCE PAID—not accrued	712 65
519,361 00	INSURANCE FUND (*Per Contra*)	620,659 19
500 00	SINKING FUNDS—Uninvested Balance in hands of Trustee	500 00
1,991,375 09	NET DISCOUNT ON SECURITIES SOLD—to be charged off prior to maturity of the Security	7,797,910 65
1,590,552 29	SUNDRY ACCOUNTS	1,534,968 75
	CURRENT ASSETS:	
$3,470,694 25	Cash in hands of Treasurer, Banks and Financial Agents	$11,124,664 97
1,057,748 79	Cash in Transit from Agencies	1,117,014 74
418,047 37	Due from U. S. Postoffice Dept.	125,307 26
850,667 42	Due from Agents and Conductors	515,961 41
2,807,765 79	Due from Other Transportation Cos.	3,093,271 11
1,013,044 65	Due from Individuals & Companies.	966,652.53
194,582 35	Bills Receivable—current	583,064 56
5,555,300 00	Miscellaneous Current Securities	824,300 00
$15,367,850 62	TOTAL CURRENT ASSETS	$18,350,236 58
$486,212,105 09		$491,821,390 88

JUNE 30, 1908.	LIABILITIES.	JUNE 30, 1909.
	CAPITAL STOCK.	
$120,000,000 00	Common	$120,000,000 00
60,000,000 00	Preferred	60,000,000 00
$180,000,000 00	TOTAL CAPITAL STOCK	$180,000,000 00
5,670,200 00	SOUTHERN RY. MOBILE & OHIO STOCK TRUST CERTIFICATES	5,670,200 00
228,701,000 00	FUNDED DEBT	234,002,400 00
32,349,000 00	OUTSTANDING SECURITIES ON LEASEHOLD ESTATES (*Per Contra*)	32,349,000 00
	EQUIPMENT OBLIGATIONS (*Per Contra*):	
$170,000 00	Equipment Trust, Series B	.....
687,000 00	Equipment Trust, Series C	$229,000 00
708,000 00	Equipment Trust, Series D	354,000 00
1,911,000 00	Equipment Trust, Series E	1,617,000 00
120,870 00	Equipment Contracts, Series F	35,550 00
313,500 00	Equipment Contract, Series G	125,400 00
3,150,000 00	Equipment Trust, Series H	2,700,000 00
2,100,000 00	Equipment Trust, Series K	1,820,000 00
7,800,000 00	Equipment Trust, Series L	7,200,000,00
604,896 80	Miscellaneous Equipment Contracts.	394,213 07
$17,565,266 80	TOTAL EQUIPMENT OBLIGATIONS	$14,475,163 07
107,000 00	UNMATURED BALANCE OF PURCHASE PRICE, NORTHEASTERN RAILROAD OF GEORGIA	107,000 00
6,366 71	UNMATURED BALANCE ON HARTWELL, IND., BRANCH	6,113 71
$464,398,833 51	TOTAL CAPITAL, FUNDED AND LIEN LIABILITIES	$466,609,876 78
	RESERVES:	
$73,355 90	For Maintenance of Way and Structures	$161,783 96
719,931 94	For Maintenance of Equipment	1,890,632 45
118,537 64	Miscellaneous	78,788 65
$911,825 48	TOTAL RESERVES	$2,131,205 06
1,744,230 96	INTEREST AND RENTALS ACCRUED—not due	1,988,435 89
772,284 93	TAXES ACCRUED—not due	752,113 83
500,987 53	UNMATURED OBLIGATIONS FOR NEW STEEL RAIL, PAYABLE ON AND AFTER JULY 1, 1910	990,940 21
519,361 00	INSURANCE FUND (*Per Contra*)	620,659 19
216,270 48	SUNDRY ACCOUNTS	265,472 15
	CURRENT LIABILITIES:	
$2,841,986 50	Interest and Rentals Due and Unpaid, including amount due July 1	$2,751,421 05
1,176,370 43	Bills Payable.	982,336 97
121,540 82	Freight Claim Authorities Outstanding	100,955 25
1,584,285 58	Unpaid Wages, including June Pay-Rolls	1,825,752 61
3,288,637 32	Audited Vouchers	2,636,019 34
817,100 47	Due Other Transportation Cos.	852,008 93
253,036 38	Due Individuals and Companies	288,914 95
172,822 78	Material and Supplies in Transit—not vouchered	319,284 15
1,101,345 70	Undetermined Liabilities awaiting adjustment	1,743,986 71
$11,357,125 98	TOTAL CURRENT LIABILITIES	$11,500,679 96
5,791,185 22	PROFIT AND LOSS	6,962,007 81
$486,212,105 09		$491,821,390 88

INCOME ACCOUNT FOR YEAR ENDED JUNE 30, 1909, COMPARED WITH YEAR ENDED JUNE 30, 1908.

1908.		1909.
	OPERATING REVENUES:	
$34,171,329 17	Freight	$34,376,619 13
14,315,961 38	Passenger	13,510,791 49
249,031 40	Miscellaneous Passenger-Train Revenue	267,721 31
1,714,942 31	Mail	1,495,202 44
1,619,920 17	Express	1,491,643 68
568,979 36	Other Transportation Revenue	758,344 00
301,552 72	Other Revenue from Operation	287,784 59
$52,941,716 51	TOTAL OPERATING REVENUES	$52,188,106 64
	OPERATING EXPENSES:	
$7,109,173 22	Maintenance of Way and Structures	$6,016,660 64
9,138,378 02	Maintenance of Equipment	8,193,753 44
1,300,232 93	Traffic Expenses	1,252,328 45
20,773,252 97	Transportation Expenses	18,348,507 08
1,533,684 99	General Expenses	1,757,730 99
$39,854,722 13	TOTAL OPERATING EXPENSES	$35,568,980 60
$13,086,994 38	NET OPERATING REVENUE	$16,619,126 04
21,262 65	OUTSIDE OPERATIONS	136,963 39
$13,108,257 03	NET REVENUE	$16,756,089 43
2,027,967 35	TAXES ACCRUED	1,916,701 65
$11,080,289 68	OPERATING INCOME	$14,839,387 78
	OTHER INCOME:	
$21,000 00	Rents Accrued from Lease of Road	$21,000 00
182,220 71	Rents Accrued from Joint Tracks, Yards and Terminals	199,185 80
$105,552 13	Miscellaneous Rents	$114,051 73
2,127,269 75	Income from Investments	1,941,125 92
330,634 27	Miscellaneous Interest and Commissions	622,948 25
$2,766,676 86	TOTAL OTHER INCOME	$2,898,311 70
$13,846,966 54	TOTAL GROSS INCOME	$17,737,699 48
	DEDUCTIONS FROM TOTAL GROSS INCOME:	
$1,351,860 25	Rents Accrued: Lease of Other Roads	$1,351,504 00
717,751 45	Rents Accrued for Joint Tracks, Yards and Terminals	769,094 52
121,100 80	Hire of Equipment—Balance	19,493 39
41,351 74	Miscellaneous Rents	45,714 79
103,515 30	Separately Operated Properties	81,463 71
358,661 99	Discount on Bonds Sold—Proportion charged to Income	535,214 44
226,808 00	Dividends Accrued on Southern Railway, Mobile & Ohio Stock Trust Certificates	226,808 00
213,292.28	Miscellaneous Deductions	31,290 36
$3,134,341 81	TOTAL DEDUCTIONS	$3,060,583 21
$10,712,624 73	TOTAL AVAILABLE INCOME	$14,677,116 27
10,310,774 80	INTEREST ON FUNDED DEBT AND EQUIPMENT OBLIGATIONS	11,087,730 85
$401,849 93	BALANCE OF INCOME OVER CHARGES	$3,589,385 42
122,707 37	ADDITIONS AND BETTERMENTS	78,285 18
$279,142 56	BALANCE CARRIED TO CREDIT OF PROFIT AND LOSS FOR THE YEAR	$3,511,100 24

TRAFFIC STATISTICS FOR YEARS ENDED JUNE 30, 1909 AND 1908.

	1909.	1908.	PERCENTAGE OF INCREASE OR DECREASE.
AVERAGE MILES OF ROAD OPERATED	7,170.36	7,136.32	Inc., 0.48
PASSENGER TRAFFIC:			
Number of Passengers Carried	14,977,980	14,091,835	Inc., 6.29
Number of Passengers Carried One Mile	622,561,542	605,333,593	Inc., 2.85
Average Distance Hauled per Passenger (Miles)	41.57	42.96	Dec., 3.24
Total Revenue from Passengers	$13,510,791.49	$13,887,899.83	Dec., 2.72
Average Receipts per Passenger per Mile (Cents)	2.170	2.294	Dec., 5.41
Total Passenger-Train Revenue	$16,765,358.92	$17,397,162.40	Dec., 3.63
Passenger-Train Revenue per Mile of Road	$2,338.15	$2,437.83	Dec., 4.09
Passenger-Train Revenue per Train Mile	$1.15513	$1.11669	Inc., 3.44
Average Number of Passengers in Each Train	42.89	38.86	Inc., 10.37
*Average Number of Passengers in Each Car	13.75	12.80	Inc., 7.42
FREIGHT TRAFFIC:			
Revenue Freight:			
Number of Tons Carried	22,133,389	22,229,260	Dec., 0.43
Number of Tons Carried One Mile	3,612,870,632	3,419,824,997	Inc., 5.64
Average Distance Hauled per Ton (Miles)	163.23	153.84	Inc., 6.10
Total Freight-Train Revenue	$34,376,619.13	$33,325,759.08	Inc., 3.15
Average Receipts per Ton per Mile (Cents)	0.952	0.974	Dec., 2.26
Freight-Train Revenue per Mile of Road	$4,794.27	$4,669.88	Inc., 2.66
Freight-Train Revenue per Train Mile	$2.05115	$1.90212	Inc., 7.83
Average Number of Tons of Freight in Each Train	215.57	195.19	Inc., 10.44
Average Number of Tons of Freight in Each Loaded Car	14.20	14.50	Dec., 2.07
All Freight (Including Company's Material Hauled Free):			
Number of Tons Carried	26,304,356	26,123,837	Inc., 0.69
Number of Tons Carried One Mile	4,464,752,873	4,070,579,471	Inc., 9.68
Average Number of Tons of Freight in Each Train	266.40	232.33	Inc., 14.66
Average Number of Tons of Freight in Each Loaded Car	17.54	17.26	Inc., 1.62
TOTAL TRAFFIC AND OPERATING EXPENSES:			
Passenger and Freight Train Revenue	$51,141,978.05	$50,722,921.48	Inc., 0.83
Passenger and Freight Train Revenue per Mile of Road	$7,132.42	$7,107.71	Inc., 0.35
Gross Operating Revenue	$52,188,106.64	$51,581,340 18	Inc., 1.18
Gross Operating Revenue per Mile of Road	$7,278.31	$7,228.00	Inc., 0.70
Gross Operating Revenue per Revenue Train Mile	$1.72801	$1.61392	Inc., 7.07
Operating Expenses (Taxes Excluded)	$35,568,980.60	$38,579,511.09	Dec., 7.80
Operating Expenses per Mile of Road	$4,960.56	$5,406.07	Dec., 8.24
Operating Expenses per Revenue Train Mile	$1.17773	$1.20711	Dec., 2.43
Net Operating Revenue	$16,619,126.04	$13,001,929.09	Inc., 27.82
Net Operating Revenue per Mile of Road	$2,317.75	$1,821.93	Inc., 27.21
Net Operating Revenue per Revenue Train Mile	$0.55028	$0.40681	Inc., 35.27

*Includes Sleeping, Parlor and Observation Cars.